

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

AUGUST, 1888.

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1888.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of August, 1885.

Name of vessel.	Captain.	Name of vessel.	Captain.	Name of vessel.	Captain.
Br. s. s. Abyssinia	Capt. D. B. Hilton	Ger. s. s. Hammonia	Capt. C. Heblch	Don. s. s. Thingvalla	Capt. S. T. H. Lamb
Advance	D. E. Griffiths	Helvetia	G. Cochran	Toronto	Jas. McAuley
Adriatic	J. O. Cameron	Hermann	A. Kohlman	Tower Hill	H. Perry
Agassiz	J. C. Adair	Hertha	M. C. Nygaard	Trave	L. Stokner
Ailes	T. M. McKnight	Herschel	Geo. Braithwaite	Trinacria	Geo. Mitchell
Am. Alamo	S. J. Kirk	Hibernian	John Brown	Trinidad	W. J. Fraser
Alameda	H. G. Moore	Holland	Thos. Foote	Tweed	S. Adamson
Alaska	Geo. S. Murray	Hondo	J. Brownrigg	Tyrian	A. Haig
Alger	W. I. Robertson	Hudson	H. R. Freeman	Urbino	P. L. Moore
Alps	H. Christoffers	Indiana	W. J. Doggs	Vancouver	C. J. Lindall
Alvena	Wm. Owen	Inventor	Wm. Jones	Venetian	E. Parry
Alvo	F. McKay	Iowa	E. W. Owens	Viking	S. H. Ellis
America	D. Williams	Island	W. Skjoldt	Ville de Bahia	F. Roux
Amerique	H. Heineke	Istria	T. H. Fox	Viola	L. Murray
Amsterdam	W. Dardine	Italy	W. Pearce	Waldensian	Whyte
Br. Amy Dora	F. W. Bonjer	Jan Dreydel	E. Smit	Waeland	H. Buschmann
Anchoria	J. J. Thompson	Kansas	W. Gleig	Wandram	T. Porath
Andes	W. Brown	Kepler	P. H. Tanner	Wergeland	L. W. Hansen
Anker	J. Evans	Kohn	G. H. Meier	Werra	E. Lassalle
Arctic	W. T. Sherburne	Komander Svend Foye	J. Brydie	Weser	A. Bruns
Arinona	S. Brooks	La Bourgogne	E. Franguel	Westernland	W. G. Handle
Ascania	F. Metzenhul	La Bretagne	M. de Jouselin	Wetherly	J. W. Harrison
Athos	H. Low	La Gascogne	Santelli	Wieland	A. Albers
Aurania	W. H. F. Hains	Lahn	H. Hellmers	Wisconsin	Edward Bentler
Australia	A. McRitchie	Lake Huron	M. L. Trunmar	Wyanoke	R. B. Boaz
Balder	F. Mohr	Lake Nepigon	F. Carey	Wyo	T. Rogers
Baltimore	J. Trener	Lake Superior	Wm. Stewart	Wyoming	C. L. Rigby
Barracouta	E. R. Hubbard	Lake Winnipeg	P. D. Murray	Ydum	D. Hagerman
Barrowmore	John Inch	Landaff City	T. H. Gore	Zaandam	W. Pausen
Baumwall	C. W. Rohan	Lampasas	M. B. Crowell	Zealand	C. H. Grant
Bavarian	H. Leach	La Normandie	G. Kersabec		
Belair	Geo. Dunlop	Leerdam	G. Stenger	U. S. C. S. A. D. Bache	J. F. Moser
Belgianland	W. A. Beynon	Lord Clive	P. Urquhart	U. S. F. O. S. S. Albatross	L. S. Tanner
Bengore Head	J. E. Brady	Lord Gough	E. M. Hughes	U. S. C. S. Blake	J. E. Pillsbury
Bento Estenger	E. F. Canal	Lord O'Neill	A. Ferrie	U. S. S. Constellation	P. F. Harrington
Berita	L. Santalari	Louisiana	E. V. Gager	U. S. S. S. Dale	Yates Sterling
Bohemia	E. Kopp	Ludgate Hill	Jas. Brown	U. S. S. Despatch	W. S. Cowles
Borderer	F. Manley	Lylian Monarch	T. C. Huggett	U. S. S. Enterprise	B. H. McCalla
Bothnia	Thomas Dutton	Main	W. Helmkaaten	U. S. S. Franklin	John C. Irvine
Britannic	H. Parsell	Manhattan	Frank Stevens	U. S. S. Galena	C. M. Chester
Britannia	J. Parazols	Manitoba	J. Amburg	U. S. C. S. Gledney	F. H. Crosby
British King	John Kelly	Marex	L. O. Moon	U. S. S. S. Independence	J. W. Philip
British Prince	S. Nowell	Marens	N. Maas	U. S. S. Jamestown	C. J. Train
British Princess	E. H. Freeth	Marengo	W. Whitton	U. S. S. Lancaster	T. F. Kane
British Queen	B. Wills	Martello	Wm. Abbott	U. S. S. Michigan	H. F. Pickling
Brooklyn City	W. Fitt	Maryland	A. H. Luckhurst	U. S. S. Minnesota	G. C. Wilcox
Buenos Aires	K. Lowe	Mentmore	R. Boucher	U. S. S. New Hampshire	F. J. Higgins
Buffalo	J. H. Malet	Michigan	R. Griffiths	U. S. S. Osage	W. B. Hoff
Bulgarian	E. Parry	Minnesota	R. J. Blacklin	U. S. S. Quinnebaugh	W. M. Folger
Burgundia	F. Dulac	Moravia	Mazin	U. S. S. Ranger	F. A. Cook
California	O. Winkler	Muriel	G. S. Locke	U. S. S. Richmond	Robert Boyd
Canada	John Robinson	Neutorian	John France	U. S. R. S. St. Louis	Wm. Whitehead
Caribbean	H. Daniel	Neustria	P. Verriers	U. S. S. Saratoga	W. H. Everett
Carroll	G. H. Brown	Nevada	J. A. R. Cushing	U. S. S. Vandalla	C. N. Schoonmaker
Caspian	A. McDougall	Neordland	H. E. Nickels	U. S. S. Wabash	C. C. Carpenter
Catalonia	J. J. Atkin	Norrona	J. J. Isakjen	U. S. S. Yantic	O. F. Heyerman
Catalina	H. M. French	Norrmann	D. Morris		
Celtic	P. J. Irving	Nova Scotia	R. H. Hughes	Am. bg. Abbie Clifford	D. W. Storer
Cephalonia	Henry Walker	Nueces	R. Bolger	Br. bk. Abyssinia	H. Hughes
Chateau Lafayette	M. C. Ollivier	Nurnberg	H. Engelbart	Am. bk. Alce	W. G. Kair
Chester	S. Wohlmut	Oceanic	John Metcalf	Br. bk. Alcear	B. Magrath
Circassian	A. Campbell	Oregon	H. C. Williams	Am. bk. Amy	H. E. Klager
Circassian	R. Barrett	Orinoco	J. S. Garvin	sch. Anna E. Krani	F. H. Parvere
City of Augusta	J. W. Catherine	Olympia	Isaac Swain	bkt. Bonny Doon	Chas. Burgess
City of Berlin	F. S. Land	Parisian	W. H. Smith	bkt. Casabueno	G. Casabueno
City of Chester	Robert Bond	Pavonia	A. McKay	bkt. Clotilda	J. W. Bowden
City of Chicago	A. W. Lewis	Peland	A. Potjer	Am. sch. Comet	W. H. Aldrich
City of Dallas	C. W. Read	Peconic	G. Evans	bg. Dal-y Boynton	C. Hardin
City of Rome	H. Young	Philadelphia	Sam. Hess	bk. Doris Eckhoff	Wm. A. Todd
City of San Antonio	J. Wilder	Phoenician	D. J. James	sp. East Croft	Jas. T. Himmer
City of Washington	J. W. Reynolds	Pieter de Connick	E. Smit	Am. sp. E. C. Sutton	C. O. Carter
Clartel	J. Clinkwinkel	Polaris	E. Schuck	Pilot boat E. C. Knight	J. F. Springer
Claymore	E. A. Craig	Polynesia	A. Kuhn	Am. bk. Edith	Wm. Foster
Colima	R. C. Jennings	Pomeranian	H. Dalziel	sch. Eldridge Louther	Jas. T. Fales
Colona	F. Henderson	Pomona	J. Legoe	Ger. bk. Ella Nicolai	W. Meisterfeld
Concordia	W. Boche	Ponce	W. Bowen	Br. bk. Estella	W. H. Morrill
Counsellor	A. McLean	Prins Maurits	Sluiter	Am. Fluorine	W. Anderson
Dalton	W. Lang	Prinz Wilhelm	H. N. Prins	Nor. Fruen	B. Bissone
Damara	Geo. Dixon	Republie	A. H. Vipond	Am. bkt. Geo. W. Sweeny	S. F. Hewitt
Denmark	R. S. Rigby	Rhetia	H. Davison	bk. Glad Tidings	E. Roberts
Devonia	John Craig	Rhinland	H. Vogelgesang	Nor. bk. Hanna	S. F. Menies
Donna	W. Topper	Rio Negro	J. C. Jamison	Am. bg. H. B. Husey	G. B. Hodgdon
Dorian	J. MacFarlane	Rubia	Guezan	Am. bk. H. C. Sibley	G. W. Hichborn
Dupuy de Lome	S. Dechaille	Roman	T. H. Smith	Am. bkt. Henry Warner	J. T. Paine
Earnmoor	R. Grey	Rugia	E. Maddox	Ger. sp. Hugo	Job. Kuhlken
Edith Godden	W. Bakker	Saale	R. Karlowa	Am. bkt. Joe E. More	A. A. Lenhard
Egypt	J. H. Bennett	Sachsen	H. Richter	sch. J. R. Bergen	C. B. Parsons
Egyptian Monarch	J. Sumner	Saint Renna	A. Jaeger	Por. bk. Julius	F. D. Vieira
Kider	J. W. Bristow	Samaris	H. Campbell	Am. bk. L. F. Munson	J. V. McKown
Elbe	H. Baur	Santiago	H. Bernpohl	It. bk. Lazzaro Bianchi	N. Dallorso
El Paso	G. Meyer	Sarmatian	J. B. Watt	Am. sp. Light-ship No. 37	Andrew Jackson
Euclides	H. S. Quick	Sarula	J. B. Allen	bkt. Louise Adelaide	F. Schive
Eura	J. de Bengoa	Scandinavian	W. Richardson	Ger. bk. Marie	Edgar Orr
England	Th. Jungst	Schedam	J. Gibson	Am. bk. Mary Pink	L. Warnken
Eria	A. F. Healey	Serapis	John Park	sch. Maud H. Dudley	D. B. Darrah
Ethiopia	John Wilson	Serra	K. Menonides	sch. Messenger	A. L. Cumming
Etruria	T. Cook	Servia	Geo. Dobson	bg. Morning Light	N. H. Falke
Euskara	S. de Felleria	Siberian	F. de Luzarraga	Ger. bk. Nanny	J. S. Fries
Exeter City	E. A. Brown	Slavonia	M. McKay	Nor. bk. Nor	C. Wilhelmj
Explorer	H. Maack	Spain	R. P. Moore	Am. sch. Orlando	O. H. Bjorness
Fidelle	C. Sander	State of Georgia	H. Schmidt	Br. bk. Queen's Island	Chas. Knecht
France	A. D. Hadley	State of Indiana	W. A. Griffiths	Am. bk. Salina	John Peterson
Fulda	K. King	State of Nebraska	G. Moodie	bk. Sarah	L. B. Hale
Gallego	J. B. Anslanga	State of Nevada	A. Ritchie	Am. bk. Savannah	B. Collette
Galila	M. Murphy	State of Pennsylvania	A. G. Brues	Ger. sp. Shakers	Carl Muller
Gallert	W. Kohlewain	State of Texas	J. A. Ste wart	Am. bk. Tam O'Shanter	Thos. Peabody
Germanic	B. Giesdell	Straits of Gibraltar	Gilbert Williams	It. bk. Teresa Accame	G. Boetto
Glendale	G. Franck	Stockholm City	Geo. Grigg	Am. bk. Thomas Brooks	F. H. Johnson
Gluckauf	F. Warnke	Suevia	W. Thompson	Br. Valonia	H. Andrews
Gutha	C. E. Le Gallais	Sully	C. Ludwig	Ger. Victoria	H. Heinrichs
Graf Bismarck	A. J. Jeffery	Switzerland	A. Voisin	Am. bgt. Victoria	T. H. Hammond </td
Grecian	J. Koberavria	Suez	J. Ueberweg	Am. sch. Warren Adams	Culard
Greece	Robert Staples	Taurina	G. W. Koch	bk. Wildwood	Chas. A. Sawyer
Guido		Toutonia	G. Busch	sch. Winnie Lowry	A. McRitchie
Gusle		The Queen	T. P. Healey	bk. Zenia	H. Henderson
					N. E. Reynolds

UNITED STATES SIGNAL SERVICE MONTHLY WEATHER REVIEW.

VOL. XVI.

WASHINGTON CITY, AUGUST, 1888.

No. 8.

INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for August, 1888, and is based upon reports of regular and voluntary observers of both countries.

Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their approximate paths shown on chart i, on which also appears the distribution of icebergs and the limits of fog-belts west of the fortieth meridian.

The severest storm of the month occurred along the trans-Atlantic tracks east of the fortieth meridian from the 22d to the 24th, inclusive. No ice was reported, except along the coast of Newfoundland, in the vicinity of Belle Isle, and in Belle Isle Straits.

The month was warmer than the average on the north Pacific coast, in the region to the northward of Montana, and along the southwestern border from western Texas to the mouth of the Colorado River. The mean temperature was normal or below in all other districts, the region of greatest deficiency extending from the central Mississippi and lower Ohio valleys northwestward to Minnesota and Dakota.

The rainfall was deficient in portions of Florida and the south Atlantic states, in the Rio Grande Valley, in the region extending from the upper lakes westward to the Pacific coast, and in the central and southern plateau districts. The most important feature in connection with this subject was the remarkably heavy falls in the Gulf states, where more than double the average amount of rain fell. A marked excess over

the average also occurred in the southern slope, and in the Ohio and Missouri valleys.

Destructive freshets occurred in many portions of the Southern states as a result of the remarkably heavy rains which fell in that section.

Violent local storms were frequent during the month, those occurring on the 20th and 21st in the middle Atlantic states being, in some instances, the most severe that have occurred in that region for many years.

In the preparation of this REVIEW the following data, received up to September 20, 1888, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 23 Canadian stations, as telegraphed to this office; 177 monthly journals and 176 monthly means from the former and 23 monthly means from the latter; 366 monthly registers from voluntary observers; 60 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, and Tennessee, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for August, 1888, determined from observations taken daily at 8 a. m. and 8 p. m., is shown by isobarometric lines on chart ii. As the plan of taking tri-daily observations at Signal Service stations was on the 1st of July, 1888, superseded by that of taking but two at the hours stated, chart ii will in future exhibit mean pressures determined from two observations. A protracted series of hourly observations has shown that the difference between the mean pressure determined from two observations taken at the hours above named and that determined from tri-daily observations is so very slight as to be practically inappreciable.

As in the preceding month the regions of greatest mean pressure cover the south Atlantic and north Pacific coasts, where the barometric means reached 30.05, or slightly above. The pressure was, as is usual in August, least over the western part of the southern plateau, where the means fell to 29.8 and below. Yuma, Ariz., reported the lowest mean, 29.76, and Augusta, Ga., the highest, 30.09, giving a range of .33 for the whole country.

As compared with the preceding month the changes in mean pressure have been, in general, very slight, and over much of

the country the means for the two months were practically the same. In the west Gulf states and on the Pacific coast, from the Columbia River southward to central California, the August means averaged about .05 below those for July, while over the central Rocky Mountain slope they were about .05 higher, these changes representing the extreme departures as compared with July.

The departures from normal pressure at Signal Service stations are given in the table of miscellaneous meteorological data. Over the greater part of the country the departures from normal were unimportant. The greatest excess occurred in the south Atlantic coast and over the northern Rocky Mountain slope, and the greatest deficiency occurred in New England and the Canadian Maritime Provinces, the maximum excess being .06 and the maximum deficiency .08.

BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are also given in the table of miscellaneous meteorological data. The ranges, as usual, conform to the general rule, that is they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. Along the Atlantic coast the extreme ranges are: .19 at Key West, Fla.,

and .79 at Portland, Me.; between the eighty-second and ninety-second meridians, .26 at Cedar Keys, Fla., and .84 at Louisville, Ky.; between the Mississippi River and Rocky Mountains, .32 at Rio Grande City, Tex., and .75 at Huron, Dak.; in the plateau regions, .30 at Yuma, Ariz., and .56 at Walla Walla, Wash.; on the Pacific coast, .22 at San Diego, Cal., and .52 at Port Angeles, Wash.

AREAS OF HIGH PRESSURE.

Five areas of high pressure traversed the country during the month. The general direction of their motion was towards the southeast. There is a marked tendency of the principal isobars in high areas at sometime in their existence to assume a triangular shape. This phase, as shown by the areas for July, 1888, generally follows soon after the occurrence of the highest winds associated with the area and which usually occur on its eastern side. This feature of triangular shaped high areas was noticeable in all of the areas of this month.

The table below gives the latitude and longitude to the nearest degree at which the centres of the high areas were first and last observed, the highest observed barometer accompanying each, the distance passed over by the centre, and the number of hours it took to describe it, and also the average hourly velocity of the centre in miles per hour:

Number of area.	First observed.		Last observed.		Highest reduced barometer reading.	Distance passed over.	Number of hours observed.	Average velocity per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.				
I.....	42	120	43	77	30.34	2625	84	30.1
II.....	48	98	33	76	30.38	2340	84	27.9
III.....	42	106	35	76	30.34	2280	108	20.1
IV.....	49	100	44	83	30.32	930	48	19.4
V.....	48	107	46	95	30.34	795	24	33.1

Average velocity of centre 25.8 miles per hour, equal to total miles divided by total hours. Average direction of motion 30° south of east.

The following is a general description of the progress of the high areas and the weather conditions attending them:

I.—This area first appeared in northern California, and, after moving for twelve hours in a northeasterly direction into Montana, then moved 30° south of east to northern Missouri; thence it pursued a course 13° north of east to central New York. High winds, forty-five miles an hour, occurred to the north of this area in Wyoming and Dakota previous to the triangular phase of the isobars, the formation of which took place on the 8th, when the 30.1 inch isobar included an area of about 240,000 square miles. Just before this a wind of fifty miles an hour occurred on its southeast side in northern Texas. The advance of the high was marked by slight falls of temperature to the east of it, not in many instances greater than 10° in twenty-four hours.

II.—This area first appeared on the 11th in western Lake Superior and disappeared off the coast of North Carolina on the 14th. Its general course was 40° south of east. Its triangular phase occurred on the 13th and is very conspicuous in the 30.1 inch isobar at the evening observation on that day. Just previously the wind was thirty-two miles an hour on its south side at Little Rock. There were at other places winds of thirty miles an hour. The rainfalls associated with this area on its eastern side were heavier on the Carolina coast than inland as the area approached the ocean. The slight (twenty-four hour) falls in temperature that took place during its progress were scarcely greater, on the average, than 10°.

III.—This area first appeared on the 20th in southeastern Wyoming. In the first twenty-four hours it moved only 100 miles. Its last appearance was on the coast of North Carolina on the 24th. The direction of its motion was 25° south of east. Very light rains occurred to the east and southeast of this area. Its triangular phase occurred in the 30.1 inch isobar, and also in the 30.2 inch, though less markedly, on the 22d. Previous to this the wind was thirty-five miles an hour

at Chicago and twenty-six miles at Grand Rapids, Mich. The attending twenty-four hour falls in temperature were usually not more than 10°, but there was one fall of 20° at Duluth on the 21st. The sky was uniformly clear in the area within the 30.2 inch isobar.

IV.—This area first appeared on the 26th in northern Dakota, and, after moving in a direction 25° south of east, disappeared on the 28th in eastern Michigan. No rain accompanied it except very far to the south. The attending winds were of moderate force, except on the 26th and 27th, when there was twenty-eight miles an hour on its eastern side at Port Huron. Its triangular phase occurred on the 28th in the 30.2 inch isobar. It was accompanied in its course by a fall of 20° in twenty-four hours in Manitoba, by a fall of 30° on Lake Superior, 20° in lower Michigan, and 10° farther to the southeast.

V.—This area first appeared in northeastern Montana on the 30th. After moving in a northeasterly direction for a day it then moved in a direction 60° south of east to central Minnesota, where it was at the 8 p. m. observation on the 31st. The only rain accompanying it was at Fort Buford, 0.06 inch, and at Bismarck, 0.02. The winds were mostly light, but twenty-six miles an hour occurred on the southeast side of it on the 30th in Minnesota and Dakota. A wind of thirty-five miles an hour occurred on its southeast side at Chicago on the 31st, just previously to the triangular phase of the 30.1 inch isobar, which included an area of 360,000 square miles. The sky was clear within this area, except at one station, Valentine, Nebr., on its western edge.

In the high areas of this month the pressures at the centres were always greater at the morning than the evening observation. For number iii the difference amounted on the 20th to 0.22 of an inch. This is probably due to the reduction of the barometer to sea-level. The current temperature of the air at the time of the observation is used as the temperature argument in deriving this reduction. This temperature is either too low at the 8 a. m. observation, thereby giving too great a reduction, or too high at the 8 p. m. observation, giving it too small. This is especially so for the far western stations, where 8 a. m. and p. m. seventy-fifth meridian times are about 6 a. m. and p. m. local times.

AREAS OF LOW PRESSURE.

On chart i will be found the approximate tracks of the centres of six areas of low pressure. The most important of these was number iv. This was a typical West Indian cyclone; its progress was the principal meteorological event of the month.

Area number iii presents the peculiarity of having traveled south from British America to western Texas, something unusual for this time of the year. It was not, however, a very well defined low. It was oblong and irregular in shape. Its longest axis extended from southwest to northeast. Its apparently devious course returning on its track in western Kansas may be due to the difficulty of locating its centre precisely.

The following table shows the latitude and longitude in which each centre of low pressure was first observed, the lowest pressure, the distance passed over by the centre, the number of hours observed, and the average velocity of centre, in miles per hour:

Number of area.	First observed.		Last observed.		Lowest reduced barometer reading.	Distance passed over by centre.	Number of hours observed.	Average velocity per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.				
I.....	41 30	100 30	43 30	68 30	29.62	1740	84	20.7
II.....	41 00	78 30	48 00	60 30	29.66	1150	48	23.9
III.....	48 30	102 00	31 30	105 00	29.64	1920	84	22.8
IV.....	25 30	79 30	46 30	61 00	29.38	3125	156	20.1
V.....	51 00	107 00	48 30	68 00	29.52	1900	72	26.4
VI.....	51 30	105 30	45 00	84 30	29.48	1080	36	30.1

Average rate of progress 23.7 miles per hour, equal to total distance divided by total hours.

In these descriptions where depths of rainfall are given they are for twelve hour periods:

I.—This area first appeared on the evening of the 1st in western Nebraska. It moved in a direction 14° north of east into the Province of Quebec. It then moved in a southeasterly direction and disappeared off the coast of Maine on the 5th. Its motion was more rapid in the middle part of its course through Wisconsin, Michigan, and Canada than at the beginning and end. It was accompanied by violent thunderstorms to the east of it, notably on the 1st at Saint Louis and at Louisville. The wind velocity at Saint Louis during the storm reached fifty-one miles an hour. The rainfall at both places was about 0.6 of an inch. A very remarkable display of lightning occurred at La Crosse during a thunderstorm from 2 a. m. to 4.30 a. m. of the 3d. The rainfall was 2.2 inches. Rains occurred on all sides of the area, and very strong winds, lasting, however, for only a short time. There was hail at Fort Maginnis in Montana to the north of it on the 2d. There were winds thirty-five miles an hour at Denver and Las Animas on the 1st to the southwest of it; forty miles an hour occurred at Chicago on the 2d to the east of it, and twenty-eight miles at La Crosse. On the 3d a velocity of sixty miles an hour occurred at Topeka and forty miles at Wichita, but these may have had some relation to an extensive low area with pressure of 29.8 to the southwest of Kansas which did not develop any proper motion.

II.—This area first appeared on the evening of the 12th in western Pennsylvania. It moved in a northeasterly direction across New York, Massachusetts, and Maine, and disappeared in the Gulf of Saint Lawrence on the 14th. The rainfall around it was mostly light. The heaviest occurred to the east of it. At Philadelphia the amount was 1.1 inches. Occasional strong winds occurred to the south of it. There was a rainfall of 2.0 inches at Oswego on 13th with wind velocity of forty-five miles an hour. Rain continued falling all around the low as it advanced and the winds increased in strength. A wind velocity of fifty miles an hour occurred at New York, forty miles at Eastport, thirty miles at Boston and Portland Me.

III.—This area first appeared in northern Dakota on the morning of the 13th and proceeded southward to western Texas, where it disappeared on the evening of the 16th. Rainfall occurred all around the centre, but over only a comparatively small area. There was a notably heavy wind at Moorhead, fifty-four miles an hour, but no rainfall. There was, however, a heavy hail-storm in its vicinity. The rain area continued small until the 14th when it spread out, there being rain from central Michigan to the Missouri River, and from southern Minnesota to southern Missouri. Winds of fifty miles an hour occurred at Fort Sully, Dak., and Valentine, Nebr., and thirty-five miles at Davenport, Iowa. On the 15th there was an extensive rain-area to the north of the low with rainfalls mostly light, except on its western edge, where there were falls of 1.8 inches at Fort McKinney and 2.5 inches at Rawlins.

IV.—This area was a typical cyclone, which described very nearly a parabolic path. Its apex was in southern Louisiana. One branch extended thence to the south of Florida and the other in a northeasterly direction across the United States and to the northeast of Nova Scotia. This area was first perceived off the southeast coast of Florida on the morning of the 16th. It moved in a direction 10° north of west for 950 miles before changing its course to the northeast. Its motion in this part of its path was only 11.3 miles per hour, much slower than in the other part of its path, where it was on the average 30.2 miles while moving in a northeasterly direction. Near the apex of parabola, where its direction of motion

changed, the centre described only 375 miles in two days. When started in a northeasterly direction its motion became gradually faster. From 8 a. m. of the 21st to 8 a. m. of the 22d it passed over 970 miles, or a little more than forty miles an hour. While the low was in the southern part of its path there was a high of 30.2 inches covering part of North Carolina, South Carolina, and Georgia, and extending into the ocean. Around this high area the low seemed to move. Throughout the whole course of the low area there were heavy rainfalls and high winds around the centre. The rainfall in southern part of Louisiana and Mississippi for the month was excessive, a great deal of it occurring in connection with this storm. On the 16th the wind reached sixty miles an hour at Point Jupiter on the Florida coast, and the rainfall was 2.02 inches. On the 18th the rain area extended up the Mississippi and Ohio River valleys. The winds were very strong on the Gulf coast on the 19th and 20th, reaching sixty miles an hour at Pensacola and fifty-five miles at Mobile on the southeast side of the low at a distance of 300 miles from the centre. At New Orleans the rainfall measured at 8 a. m. for previous twelve hours was 7.9 inches, and the wind was estimated to have blown at the rate of ninety miles an hour from 3.30 to 4 a. m. The anemometer connection with self-register was broken by the storm. Great damage was done by the storm in the city and vicinity. The further course of the storm was marked by heavy rainfalls over extensive areas, as for instance 2.0 inches from Louisville to Cincinnati and 3.25 inches at Norfolk. High winds also occurred at a greater number of stations as the storm advanced. There was a wind velocity of fifty miles an hour at Nashville and Knoxville, and forty miles at Norfolk and Block Island, and high winds all along the intermediate coast on the 21st. High northerly winds also prevailed in the Lake region on the 21st and 22d, reaching thirty-five miles an hour at Port Huron and Chicago and thirty miles at Oswego. These winds on the lakes were probably related also to the high area number iii. On the 22d there was a velocity of fifty miles an hour at Eastport and Block Island, and thirty-five miles an hour at New York. On the 21st, in connection with this low and to the east of it, there was a series of tornadoes in eastern Maryland, accompanied by intense thunder and lightning. A marked feature of the air in the surrounding country just before the occurrence of the tornadoes was the excessive humidity. At Baltimore it was 95 per cent. of saturation. The maximum temperature was not so very high. Late in the afternoon it was only $82^{\circ}.4$. There were no very marked twenty-hour hour falls in temperature in the country over which the cyclone passed.

V.—This area first appeared to the north of Montana on the 24th, and moving in a direction slightly south of east, disappeared in the Gulf of Saint Lawrence. Only a very slight rainfall in western New York occurred in connection with it. There followed in its wake, associated also with high area number iv on its eastern side, a very considerable twenty-four-hour fall in temperature, amounting to 30° on the 26th in northern Michigan and 20° later on farther to the east.

VI.—This area first appeared to the north of Montana on the morning of the 29th. It traveled southeast, and the centre was in northern Michigan at the evening observation of the 31st. There were light rains at two stations in Michigan on the 30th. On the 31st the area spread out into a very extensive one of low pressure, the 29.9 inch isobar including a stretch of country about two hundred miles wide extending from the Gulf of Saint Lawrence through the region of the Great Lakes and down the Mississippi Valley to the Gulf of Mexico. This area was not attended by any notable changes in temperature.

NORTH ATLANTIC STORMS FOR AUGUST, 1888.

[Pressure in inches and millimetres; wind-force by Beaufort scale.]

The paths of the depressions that appeared over the north Atlantic Ocean during August, 1888, have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels, received through the co-

operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight depressions have been traced, of which five advanced northeastward over Newfoundland; one moved eastward over the Grand Banks from Nova Scotia and from thence passed northward over Newfoundland, and two apparently developed over mid-ocean. One storm, traced as land low area number iv, is given a track from the straits of Florida to the north-central coast of the Gulf of Mexico. Three storms traversed the ocean from coast to coast. The depressions generally pursued normal east-northeast tracks, with a rather slow and irregular progressive movement over mid-ocean. The West Indian cyclone augmented in energy during its advance over the Gulf of Mexico, and on the 18th and 19th was attended by violent wind squalls and incessant rain. On the 27th a telegram was received from Havana, Cuba, stating that at 6 a. m. of that date a cyclonic storm of moderate energy was central southwest of that station, moving northwest. The severest disturbances of the month were reported over the ocean east of the fortieth meridian from the 21st to the 24th, inclusive, attending the advance of a depression which moved northeastward over Newfoundland during the 18th.

In August, 1887, nine depressions were traced, of which three originated in the tropics; five advanced eastward over Newfoundland; and one left the American coast in about N. 38°. Three storms traversed the ocean from coast to coast, of which two passed eastward from the Gulf of Saint Lawrence, and one moved from the West Indies along the course of the Gulf Stream to the sixtieth meridian, and thence advanced northeast to the northward of the fifty-fifth parallel. The depressions over mid-ocean were rather evenly distributed throughout the month, and were, as a rule, accompanied by disturbances of pronounced strength. Over the ocean east of the twentieth meridian the weather was generally fine, while during the first half of the month settled weather prevailed off the American coast south of the forty-fifth parallel. The tropical cyclones which advanced toward the Florida coast north of the West Indies, and subsequently moved northeast parallel with the American coast, were of the energetic and destructive type of storms peculiar to that region during the summer season.

In August, 1888, the general character of the weather over the north Atlantic was seasonable, and while the almost continued presence of cyclonic areas over the ocean north of the fiftieth parallel contributed to frequent barometric fluctuations and shifts of wind along the trans-Atlantic routes, the depressions seldom occasioned disturbances of marked energy.

In the following descriptions of the depressions traced, positions are given in degrees, latitude and longitude, except in cases where twenty-five to thirty-five minutes are cited, when they are shown in degrees and half degrees:

1.—This depression was a continuation of ocean storm number 8 traced for July, 1888, and on August 1st was apparently central over the northern extremity of Newfoundland. During the next three days the storm-centre remained nearly stationary north of Newfoundland, with fresh to strong gales to the fortieth parallel. Subsequent to the 4th the storm pursued a normal east-northeast course and disappeared north of the British Isles after the 7th.

2.—This depression advanced eastward from Nova Scotia during the 5th, and on the morning of the 6th was central in about N. 42°, W. 58°, from whence it moved east-northeast to the fifty-first meridian by the 7th. During this and the following two dates the centre of depression pursued an irregular course over and near the Banks of Newfoundland, and afterwards disappeared to the northward of Newfoundland, being unattended throughout by noteworthy features. The abnormal direction of movement of this depression subsequent to the 6th was evidently due to the presence over the ocean to the eastward of an area of high barometer whereby its eastward advance was impeded.

3.—This depression apparently developed over mid-ocean to

the northward of the Azores, and during the 10th, 11th, and 12th moved northeast and disappeared north of the British Isles after the 12th, attended by moderate to fresh gales and barometric pressure falling to about 29.50 (749.3) on the 11th.

4.—This depression is first located over mid-ocean in N. 53°, W. 33°, under date of the 13th; by the 14th the storm-centre had moved northeast to the fifty-eighth parallel, and thence recurved southeast to the fifty-fifth parallel by the 15th, after which it apparently moved westward under the influence of depression number 5 which had advanced northeastward from Newfoundland.

5.—This depression moved northeastward over Newfoundland during the 15th and on the 16th was central in N. 53°, W. 45°, with minimum pressure about 29.60 (751.8). Advancing slowly eastward the centre of depression is last located in N. 54°, W. 23°, under date of the 19th, after which it recurved to the northwestward and united with depression number 6, which had advanced from the American coast.

6.—This depression was central over the eastern portion of the Gulf of Saint Lawrence on the 18th, and from thence advanced to the thirtieth meridian in latitude N. 56° by the 20th, attended by moderate to fresh gales and barometric pressure falling to about 29.50 (749.3). By the 21st the storm-centre had recurved somewhat to the northwestward with an appreciable decrease in central pressure, and by the 22d had moved to N. 55°, W. 30°, where the minimum barometer fell below 29.00 (736.6). From this position the depression passed east-southeast to N. 51°, W. 14°, by the 23d, and from thence recurved to the northwestward by the 24th, after which date it disappeared north of the region of observation. The severest disturbances of the month in the trans-Atlantic routes were occasioned by this depression from the 21st to the 24th, inclusive, the gales, in instances, attaining hurricane force.

7.—This depression was a continuation of land area number iv, whose track is traced from the vicinity of the Bahama Islands west-northwest to the north-central coast of the Gulf of Mexico and thence to the middle Atlantic coast. On the 22d the centre was located off the western extremity of Nova Scotia where a minimum pressure of about 29.30 (744.2) was reported. On this date strong to whole gales attaining hurricane force prevailed west of the sixtieth meridian. Moving northeast over Nova Scotia and Newfoundland during the 22d and 23d the storm is thence given a normal track to the northward of the British Isles where it disappeared after the 27th, its course being attended throughout by low barometric pressure and fresh to strong gales.

8.—This storm passed northeastward over Labrador during the 30th, and on the 31st was apparently central about four degrees south of the southern extremity of Greenland.

OCEAN ICE.

On chart i the following positions of icebergs reported during the month are shown by ruled shading:

3d.—S. S. "Lake Winnipeg," off Belle Isle, two bergs.

4th.—S. S. "Parisian," in Straits of Belle Isle, several bergs.

5th.—S. S. "Sarnia," in Straits of Belle Isle, several large bergs; S. S. "Glendale," in Straits of Belle Isle to Greenlet Islands, bergs.

6th.—S. S. "Wandrahm," in Straits of Belle Isle, large bergs; S. S. "Hibernia," eight miles off Greenly Islands, a large berg; several large bergs in the Straits.

8th.—S. S. "Vancouver," detained twelve hours at Belle Isle by ice; numerous bergs were observed in the middle of the Straits.

10th.—S. S. "Sarmatian," from Belle Isle to six miles south from Greenly Island, eight large bergs; S. S. "Lake Huron," at Belle Isle, a few large bergs; S. S. "Lake Superior," off Point Amour, several bergs, and several off Belle Isle.

12th.—S. S. "Circassian," off Belle Isle, several bergs.

13th.—S. S. "Grecian," off Belle Isle, ten bergs.

16th.—S. S. "Glendale," near Grois Island, seven bergs.

18th.—S. S. "Pomeranian," in Straits of Belle Isle, some

small detached bergs; S. S. "Toronto," N. 51° 53', W. 55° 00', a large berg; several small ones in the Straits of Belle Isle.

19th.—S. S. "Concordia," near Belle Isle Light, a large berg, apparently aground.

22d.—S. S. "Colima," off Cape Norman, a small berg; S. S. "Wandrahm," south of Belle Isle, fractures of bergs and lumps; east of Belle Isle, a large berg.

24th.—S. S. "Siberian," Belle Isle Light, a large berg; S. S. "Sarnia," off Belle Isle, a medium berg.

25th.—S. S. "Lake Winnipeg," off Belle Isle Light, a large berg.

No icebergs were reported save in the Straits of Belle Isle and off the extreme northern coast of Newfoundland, where their presence was noted on fourteen days.

In July, 1888, several icebergs were observed off the south-east coast of Newfoundland, and numerous icebergs and large quantities of field ice were encountered in and to the eastward of the Straits of Belle Isle.

In August, 1887, the aggregate quantity of ice reported over the Banks of Newfoundland was largely in excess of the average for the month, while in the vicinity of Belle Isle it was deficient.

The August ice reports for the last six years show that the average southern limit of Arctic ice is in about N. 44° 45', and the average eastern limit in about W. 44° 10', and that during this month bergs are commonly observed in the Straits of Belle Isle. The entire absence of icebergs over the Banks of Newfoundland during August, 1888, was, therefore, an unusual feature.

The following table shows the southern and eastern limits of the region within which ice was reported for August during the last seven years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
August, 1882	46 50	46 00	August, 1882	46 50	46 00
August, 1883	43 26	51 41	August, 1883	48 00	44 00
August, 1884	43 24	48 44	August, 1884	47 50	43 50
August, 1885	43 48	52 04	August, 1885	48 03	42 45
August, 1886	48 35	48 46	August, 1886	50 00	48 00
August, 1887	42 21	49 51	August, 1887	48 06	40 00
August, 1888	Straits of Belle Isle		August, 1888	51 53	55 00

FOG.

Fog was reported at Saint John's, N. F., on the 10th, 15th, 18th, and 29th.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of Newfoundland fog was reported on twenty-six days, as compared with twenty-eight days for July, 1888, and eighteen days for August, 1887. To the westward of the sixtieth meri-

dian fog was reported for a total of nine days, as compared with thirteen days for the preceding month, and eleven days for August, 1887.

As compared with the charted fog-belts for July, 1888, the southern limit of the Newfoundland areas has contracted about one degree, while off the American coast fog was more frequently encountered along and to the southward of the fortieth parallel.

With the exception of the 12th and 13th, when variable winds and high barometric pressure prevailed over the Grand Banks, the development of fog to the eastward of the sixtieth meridian attended the circulation of winds in the southeast quadrant of areas of low barometric pressure which advanced eastward from the American continent north of the fortieth parallel. To the westward of the sixtieth meridian fog was generally reported following the passage of cyclonic areas to the eastward.

The following are the limits of fog-areas on the north Atlantic Ocean during August, 1888, as reported by shipmasters:

Date.	Vessel.	Entered.			Cleared.		
		Lat. N.	Lon. W.	Time.	Lat. N.	Lon. W.	Time.
1	S. S. Italy	40 40	66 30		40 40	66 45	
1-2	Bk. Valona	46 15	51 00		46 25	51 18	
5-6	S. S. City of Chester	40 33	71 30	1.30 a. m.	41 50	62 40	9 a. m.
5	Buffalo	42 30	64 54	8 a. m.	42 14	69 15	Midnight.
6	Sarnia	52 38	53 01		52 57	51 55	
7	Manhattan	Quarantine, New York.					
7	City of Chicago	43 53	57 33	3.15 a. m.	45 36	51 44	11 p. m.
8	Nova Scotian	46 17	53 40	10 a. m.	46 32	52 59	3.30 p. m.
8	Ailsa	36 17	74 51	2 a. m.	36 55	74 00	8 a. m.
8	Viola	42 12	51 26	1 a. m.	42 00	52 01	4 a. m.
9	Manitoba	44 35	53 05	midnight.	45 31	47 49	Midnight.
10	Lake Huron	Straits of Belle Isle.					
10	Ems	45 22	49 00	2.30 p. m.	44 49	51 00	8 p. m.
10	Helvetia	40 43	66 53	9 a. m.	40 41	68 06	2.40 p. m.
10-11	Lake Superior	At Point Amour.					
10-11	Serapis	45 33	58 34	4.30 p. m.	46 27	60 00	6.30 a. m.
11	Westernland	43 08	50 55	4 p. m.	43 57	48 25	1 a. m.
12	Thingvalla	49 22	48 24	0.15 a. m.	48 43	49 18	8.17 a. m.
13	State of Nevada	43 48	56 38	8.10 a. m.	43 14	58 37	3.55 p. m.
13	Leerdam	46 47	45 05	7.30 a. m.	46 17	46 54	2 p. m.
14	City of Berlin	44 24	53 30	10.30 p. m.	44 06	54 28	1.30 a. m.
15	Egyptian Monarch	42 59	48 32		42 08	51 16	
16-17	Republic	43 23	58 50		41 51	64 41	
16-17	Main	45 05	47 50	11.49 p. m.	45 03	48 10	1.28 a. m.
17	Germanic	41 50	62 16	2 a. m.	43 21	56 43	7.30 p. m.
18	British King	41 14	66 30	0.50 p. m.	40 30	67 00	4.30 p. m.
18-19	Fulda	45 00	54 00	noon.	43 30	60 00	6 a. m.
19-20	Belgenland	46 17	49 17	9.20 a. m.	43 50	57 28	3.50 p. m.
20	Gallia	43 32	48 23	11 a. m.	42 51	50 55	8 p. m.
23	Phonician	42 39	65 15		42 38	65 25	
23-24	Siberian	53 00	50 00		51 30	55 45	
24	Samarra	43 40	48 47		43 15	49 55	
25-26	Nevada	48 22	51 43	10.30 a. m.	44 49	57 02	Noon.
26	Amsterdam	47 26	43 45	7 a. m.	45 21	50 35	10 a. m.
26-27	Samarra	42 37	65 56		42 30	67 15	
27	Elbe	42 25	62 05	4 a. m.	42 15	62 45	5.30 p. m.
27	Celtic	48 16	43 12		47 59	44 23	
28	Island	45 04	52 02	1.30 a. m.	44 22	54 11	
29	City of Chicago	46 16	47 24	2.50 a. m.	45 44	49 13	8.50 a. m.
30	Donau	46 40	44 20	7 a. m.	46 19	46 14	3 p. m.
31	Venetian	47 03	42 56	7 p. m.	46 52	43 32	10 p. m.
31	Mareca	46 00	55 28	9 a. m.	45 42	50 40	2.30 p. m.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for August, 1888, is exhibited on chart ii by the dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above.

August, 1888, was warmer than usual in the region to the northward of Montana, in the northern and middle plateau districts, and thence westward to the Pacific Ocean, and also

in the lower portions of the southern slope and southern plateau. Along the Atlantic coast from Connecticut to South Carolina the temperature was about normal, and in all other districts the month was colder than the average August, the region over which temperature was below the normal embracing the greater part of the country. The greatest excess of temperature occurred on the Pacific coast northward of the thirty-eighth parallel, and in British Northwest Territory northward of Montana, in which districts the mean temperatures generally ranged from 4° to 6° above the normal; the greatest deficiency occurred in the Missouri, upper Mississippi, and lower Ohio valleys, and in the Canadian Maritime Provinces, the departures generally ranging from 3° to 4°.

The following are some of the most marked departures from normal temperatures at Signal Service stations:

Above normal.		Below normal.	
Walla Walla, Wash.....	7.0	Quebec, Quebec.....	5.0
Astoria, Oreg.....	6.2	Denver, Colo.....	4.6
Swift Current, N. W. T.....	6.0	Springfield, Ill.....	4.2
Portland, Oreg.....	5.0	La Crosse, Wis.....	4.0
Medicine Hat, N. W. T.....	5.0	Father Point, Quebec.....	4.0
Sacramento, Cal.....	4.4	Sidney, N. S.....	4.0
Roseburg, Oreg.....	4.2	North Platte, Nebr.....	3.8
Red Bluff, Cal.....	3.7	Saint Louis, Mo.....	3.8

The absolute extremes of temperature within the United States were: maximum, 116°, at Fort McDowell, Ariz., on the 11th; minimum, 30°, at Saint Vincent, Minn., on the 17th; range for the entire country, 86°.

The maximum temperatures of August in past years were equalled during August, 1888, at a few stations over the middle and southern portions of the eastern Rocky Mountain slope, and on the southern New England coast. At Fort Elliott, Tex., the maximum, 104°, which occurred on the 5th, was 3° higher than any previous maximum for August.

The minimum temperatures of August, 1888, were nowhere lower than have been observed during August in former years. They were, however, within from 1° to 3° of the lowest on record at several stations in the Ohio Valley, the lower lake region, New England, and middle Atlantic states, and at a few stations in the south Atlantic and east Gulf states, extreme northwest, and over the middle slope of the Rocky Mountains.

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. The monthly ranges were greatest in the extreme northwest, where they exceeded 60°; they were, as usual, least along the Gulf and north Pacific coasts, where they fell to 20°, or below, at some stations.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
Saint Vincent, Minn.....	65.9	Jupiter, Fla.....	18.2
Moorhead, Minn.....	61.8	Fort Canby, Wash.....	18.3
Bismarck, Dak.....	61.6	Cedar Keys, Fla.....	19.9
Fort Buford, Dak.....	60.3	Key West, Fla.....	20.0
Poplar River, Mont.....	60.0	Port Eads, La.....	20.0
Fort Totten, Dak.....	59.4	Corpus Christi, Tex.....	20.0

FROST.

Frosts occurred during August on the following dates:

1st, Carson City, Nev.; Fort Klamath, Oregon. 2d, Watseka, Kans.; Carson City, Nev. 5th, Fort Klamath, Oregon. 7th, Moorhead, Minn. 8th, Pike's Peak, Colo.; Hay Springs, Nebr. 9th, Fort Totten, Grand Forks, and Gallatin, Dak.; Independence, Iowa; Medford, and Saint Vincent, Minn.; Fort Maginnis, Mont. 10th, Lansing and Lathrop, Mich.; Saint Vincent, Minn. 11th and 12th, Colorado Springs, Colo. 13th, Sycamore, Ill.; Fort Klamath, Oregon. 14th, Port Huron, Mich.; Fort Klamath, Oregon, Wellsborough, Pa. 15th, Fort Maginnis, Mont. 17th, Bismarck, Davenport, Fort Buford, Fort Totten, Gallatin, and Grand Forks, Dak.; Marquette, Mich.; Moorhead and Saint Vincent, Minn. 18th, West Branch, Mich.; Moorhead, Minn. 21st, Lansing, Mich. 22d, Pike's Peak, Colo.; Sycamore and Windsor, Ill.; Lansing, Marquette, Mount Pleasant, Ovid, and Petersburg, Mich.; Wellsborough, Pa.; Cedar Springs, S. C. (on lowlands); Deuster, Embarras, and Wauconda, Wis. 23d, Beason, Hennepin, Philo, and Sycamore, Ill.; Angola, Delphi, Lafayette, and La Grange, Ind.; Taunton, Mass.; Adrian, Alma, Bell Branch, Benton Harbor, Berlin, Bronson, Buchanan, Detroit, Grand Haven, Ionia, Lathrop, Lansing, Long Lake, Petersburg, Saint John's, Thornville, and West Branch, Mich.; Auburn and Savona, N. Y.; Lenoir, N. C.; Garrettsville, Lordstown, and Wauseon, Ohio; Erie, Corry, Dyberry, Meadville, and Wellsborough, Pa. 24th, Thornville and Detroit, Mich.; Lenoir, N. C. 26th, Pike's Peak, Colo. 27th, Bell Branch and Saint John's, Mich.; Eden Centre, N. Y.; Wellsborough, Pa. 28th, Alma, Arbela, Bad Axe, Berlin, Bronson, Coldwater, De-

troit, Fletcher, Grand Haven, Hanover, Ionia, Lathrop, Lansing, Mio, Omer, Petersburg, Vienna, and West Branch, Mich.; Oswego, N. Y.; Garrettsville, Lordstown, and Wauseon, Ohio; Erie, Corry, Dyberry, and Wellsborough, Pa.; Embarras, Wis. 29th, Garrettsville, Ohio; Dyberry and Quaker-town, Pa. 30th, Pike's Peak, Colo.; Hart, Mich.; Fort Maginnis, Mont.; Wytheville, Va.; Embarras, Wis. 31st, Georgetown, Colo.; Marquette and Noble, Mich.; Saint Vincent and Spring Valley, Minn.

The following are reports of injury to vegetation by frosts during the month:

Fort Totten, Dak.: frost on the 17th injured oats and wheat in the surrounding country.

Moorhead, Minn.: frost on the 17th caused considerable damage near this place.

Erie, Pa.: corn and other crops were injured by frost on the 28th.

Birmingham, Oakland Co., Mich.: frost was quite heavy on the night of the 27th, doing considerable injury to buckwheat and potatoes.

Table of comparative maximum and minimum temperatures for August.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Alabama.....	Mobile.....	93.2	69.5	100.0	1874	63.0	1884	18
Do.....	Montgomery.....	97.2	61.6	103.0	1874	59.1	1887	16
Arizona.....	Prescott.....	94.0	45.0	99.0	1878	35.0	1876	13
Do.....	Fort Apache.....	.....	.....	98.1	1885	41.0	1880	10
Arkansas.....	Fort Smith.....	100.0	64.0	104.5	1886	57.1	1885, 86, 87	7
Do.....	Little Rock.....	97.0	62.7	102.0	1881	50.2	1887	10
California.....	San Francisco.....	85.1	50.8	89.0	1879	45.4	1886	18
Do.....	San Diego.....	82.0	57.0	91.5	1884	54.0	1879, 1884	17
Colorado.....	Denver.....	92.3	49.2	105.0	1878	44.0	1876	17
Do.....	Montrose.....	92.8	46.4	97.5	1885	41.8	1887	4
Connecticut.....	New Haven.....	90.8	49.8	90.0	1876, 81, 84	45.1	1885	16
Do.....	New London.....	88.0	54.0	90.0	1873	47.5	1884	17
Dakota.....	Fort Buford.....	96.5	36.3	107.0	1882	34.5	1886	10
Do.....	Yankton.....	96.6	44.5	103.0	1873	40.7	1886	16
Dia. of Columbia.....	Washington City.....	97.2	51.5	101.0	1881	50.0	1874	18
Florida.....	Jacksonville.....	96.0	67.2	100.0	1874	64.9	1886	17
Do.....	Key West.....	91.0	88.2	100.0	1886	72.0	1882, 1884	18
Georgia.....	Atlanta.....	95.7	61.5	96.2	1881	54.6	1887	10
Do.....	Savannah.....	97.1	64.3	100.0	1878	63.0	1879	18
Idaho.....	Boise City.....	102.6	46.8	105.0	1883	39.0	1881	12
Illinois.....	Cairo.....	97.0	58.0	103.0	1881	54.5	1885	17
Do.....	Chicago.....	91.0	50.9	96.0	1874	49.1	1887	17
Indiana.....	Indianapolis.....	97.5	48.9	101.0	1881	47.7	1885	16
Indian Ter.....	Fort Sill.....	105.0	60.0	105.0	1881	53.0	1880	12
Iowa.....	Dubuque.....	96.0	47.5	99.1	1887	41.0	1875	16
Do.....	Des Moines.....	96.6	46.0	103.0	1881	45.6	1887	10
Kansas.....	Dodge City.....	103.5	51.8	101.8	1887	50.0	1880	13
Do.....	Leavenworth.....	96.6	52.8	107.0	1874	48.0	1887	15
Kentucky.....	Louisville.....	98.5	53.5	104.6	1881	52.4	1885	16
Louisiana.....	New Orleans.....	93.7	69.5	96.5	1877	65.5	1884	13
Do.....	Shreveport.....	97.3	69.0	105.0	1881	58.0	1880	16
Maine.....	Eastport.....	79.0	47.2	88.0	1880	45.0	1880	16
Do.....	Portland.....	85.2	48.5	95.0	1876	47.5	1887	17
Maryland.....	Baltimore.....	95.8	55.0	96.0	1881	52.0	1874	16
Massachusetts.....	Boston.....	88.2	52.0	96.8	1881	47.0	1880	18
Michigan.....	Marquette.....	93.5	42.5	97.7	1886	36.0	1886	15
Do.....	Grand Haven.....	80.2	46.0	92.0	1881	42.5	1875	16
Minnesota.....	Saint Vincent.....	96.3	30.4	103.2	1886	27.4	1885	8
Do.....	Saint Paul.....	94.0	46.3	98.0	1880	41.1	1887	16
Mississippi.....	Vicksburg.....	96.7	67.6	100.0	1878	61.8	1885	16
Missouri.....	Saint Louis.....	97.0	56.0	106.4	1881	52.1	1887	18
Montana.....	Ft. Assinaboine.....	96.0	42.8	98.0	1872	37.0	1881	9
Do.....	Helena.....	92.8	42.5	95.1	1886	34.0	1880	9
Nebraska.....	North Platte.....	97.5	44.0	103.0	1878	42.0	1876	14
Do.....	Omaha.....	99.2	52.9	105.0	1874	46.3	1886	16
Nevada.....	Winnemucca.....	95.6	45.0	102.5	1882	26.0	1887	10
New Jersey.....	Atlantic City.....	87.8	51.4	91.8	1881	48.8	1885	15
New Mexico.....	Santa Fe.....	90.0	40.5	97.0	1878	40.0	1882	15
New York.....	Buffalo.....	85.0	49.5	94.2	1887	44.0	1880	16
Do.....	New York City.....	90.3	53.2	96.0	1881	51.0	1885	17
North Carolina.....	Charlotte.....	.....	.....	100.5	1881	52.8	1887	10
Do.....	Wilmington.....	95.2	56.8	99.0	1878	55.6	1887	18
Ohio.....	Cincinnati.....	97.4	52.3	101.0	1881	50.9	1885	18
Do.....	Sandusky.....	95.2	48.6	96.0	1881	48.5	1882	12
Oregon.....	Portland.....	92.3	52.0	94.5	1885	53.0	1876	16
Do.....	Roseburg.....	92.4	47.0	97.2	1884	40.5	1882	11
Pennsylvania.....	Pittsburg.....	93.2	48.3	99.8	1881	45.8	1887	16
Do.....	Philadelphia.....	97.8	54.0	99.0	1881	51.1	1885	18
Rhode Island.....	Block Island.....	81.0	35.4	82.5	1887	49.3	1887	8
South Carolina.....	Charleston.....	96.5	67.0	97.9	1887	62.0	1879	16
Tennessee.....	Knoxville.....	96.0	53.3	100.0	1881	50.0	1879	18
Do.....	Memphis.....	98.9	60.5	102.0	1881	58.6	1887	16
Texas.....	Brownsville.....	97.2	73.0	101.0	1883	66.0	1884	12
Do.....	Fort Elliott.....	104.1	57.0	101.0	1881	45.0	1880, 1882	9
Utah.....	Salt Lake City.....	98.2	54.0	101.0	1875	44.0	1880	15
Virginia.....	Lynchburg.....	98.5	53.0	100.0	1881	49.8	1887	16
Do.....	Norfolk.....	98.4	50.0	99.0	1881	58.0	1874	18
Washington.....	Spokane Falls.....	101.8	47.5	101.5	1882	38.0	1881, 1882	8
Do.....	Olympia.....	86.0	44.4	92.2	1885	40.1	1887	12
Wisconsin.....	La Crosse.....	91.3	49.9	96.0	1874, 81, 87	42.3	1887	16
Do.....	Milwaukee.....	89.9	48.7	98.0	1874	42.0	1875	18
Wyoming.....	Cheyenne.....	85.5	40.1	96.1	1882	34.0	1876	16

TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for August, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
Canby, Fort, Wash.	67.7	61.0	6.7	64.0	58.7
Cedar Keys, Fla.	82.0	83.0	9.0	86.7	80.9
Charleston, S. C.	87.5	82.0	5.5	84.9	79.6
Eastport, Me.	51.2	49.3	1.9	50.0	58.0
Galveston, Tex.	89.0	83.5	5.5	86.4	81.9
New York City	75.0	69.1	5.9	72.8	71.0
Pensacola, Fla.	86.5	80.0	6.5	83.4	80.0
Portland, Me.	62.0	57.0	5.0	58.9	64.8
Portland, Oregon	74.5	70.0	4.5	72.6	69.0

COTTON REGION REPORTS.

In the accompanying table are given for August, 1888, the average rainfall and the means of the maximum and minimum temperatures in the cotton regions, together with normals computed from similar observations of former years:

Temperature and rainfall data for the cotton districts, August.

Districts.	Rainfall.			Temperature.								Extremes for Aug., 1888.	
	Average for Aug. of six preceding years.	Average for Aug., 1888.	Departures.	Maximum.			Minimum.						
				Mean for Aug. of six preceding years.	Mean for Aug., 1888.	Departures.	Mean for Aug. of six preceding years.	Mean for Aug., 1888.	Departures.				
Inches	Inches	Inches.	°	°	°	°	°	°	°	°	°		
New Orleans....	3.77	8.16	+ 4.39	91.5	90.4	- 1.1	71.2	71.6	+ 0.4	100	65		
Savannah....	5.53	5.19	- 0.34	91.0	91.9	+ 0.9	71.4	71.6	+ 0.2	104	58		
Charleston....	6.34	3.81	- 2.53	89.4	90.2	+ 0.8	69.3	70.1	+ 0.8	100	50		
Atlanta.....	5.00	5.93	+ 0.93	87.9	89.4	+ 1.5	67.8	68.8	+ 1.0	101	51		
Wilmington...	5.65	3.50	- 2.15	87.8	90.3	+ 2.5	67.6	68.8	+ 1.2	103	48		
Memphis.....	2.75	6.03	+ 3.28	89.1	88.8	- 0.3	66.6	68.3	+ 1.7	103	57		
Galveston....	2.65	6.72	+ 4.07	93.9	92.5	- 1.4	71.2	73.5	+ 2.3	103	59		
Vicksburg....	3.06	7.33	+ 4.27	90.7	90.2	- 0.5	70.1	71.6	+ 1.5	98	55		
Montgomery...	3.43	7.60	+ 4.17	90.3	89.9	- 0.4	68.8	69.5	+ 0.7	99	52		
Augusta.....	4.20	4.15	- 0.05	89.6	91.2	+ 1.6	68.3	69.8	+ 1.5	102	53		
Little Rock....	2.33	4.76	+ 2.43	91.1	91.1	0.0	66.4	71.6	+ 5.2	103	53		
Mobile.....	3.02	8.91	+ 5.89	92.1	90.3	- 1.8	69.9	71.1	+ 1.2	103	57		

The rainfall was about normal in the districts of Savannah and Augusta; in Charleston and Wilmington districts marked deficiencies occurred; and, with the exception of Atlanta, there were very large excesses in all other districts, the rainfall being more than double the average in the districts of New Orleans and Little Rock, and three times the average in those of Vicksburg, Montgomery, and Mobile.

The means of the maximum temperatures were for the most part about the average, and the means of the minimum temperatures were above the average in all districts.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported

by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for August, 1888; (4) the departures of the current month from the normal; (5) and the extreme monthly means for August during the period of observations and the year of occurrence:

State and Station.	County.	(1) Normal for the month of Aug.	(2) Length of record.	(3) Mean for Aug., 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for August.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
Arkansas.			Years						
Lead Hill.	Boone.	77.6	6	79.2	+1.6	81.0	1886	75.5	1882
California.									
Sacramento.	Sacramento.	71.0	22	74.4	+3.4	75.0	1875	66.2	1887
Connecticut.									
Southington.	Hartford.	69.0	19	69.8	+0.8	72.8	1872		
Florida.									
Merritt's Island.	Brevard.	80.6	5	81.5	+0.9	81.5	1888	79.9	1886
Illinois.									
Galeonda.	Pope.	77.8	11	76.7	-1.1				
Peoria.	Peoria.	75.3	32	72.9	-2.4	80.5	1881	69.9	1886
Riley.	McHenry.	68.6	37	66.1	-2.5				
Indiana.									
Logansport.	Cass.	73.7	34	74.4	+0.7	78.2	1881	66.6	1866
Vevay.	Switzerland.	75.9	21	74.1	-1.8				
Iowa.									
Monticello.	Jones.	70.2	35	69.5	-0.7	75.0	1878	66.0	1885
Independence.	Buchanan.	70.0	13	69.0	-1.0				
Kansas.									
Lawrence.	Douglas.	75.4	21	72.9	-2.5	82.8	1874	71.1	1884
Wellington.	Sumner.	76.7	10	79.1	+2.4	82.7	1881	70.1	1884
Independence.	Montgomery.	78.3	17	76.5	-1.8	85.3	1881	73.4	1885
Louisiana.									
Point Pleasant.	Tensas.	81.5	10	79.2	-2.3				
Grand Coteau.	St. Landry.	81.8	6	79.9	-1.9				
Maine.									
Gardiner.	Kennebec.	66.5	52	64.1	-2.4	71.5	1840	63.0	1866
Cornish.	York.	68.4	31	65.8	-2.6	73.9	1876	62.4	1866
Maryland.									
Cumberland.	Alleghany.	71.1	17	69.2	-1.9	76.0	1872-73	69.0	1879
Massachusetts.									
Somerset.	Bristol.	73.1	18	73.0	-0.1				
Newburyport.	Essex.	67.1	10	67.2	+0.1	69.5	1882	65.4	1887
Michigan.									
Adrian.	Lenawee.	68.4	11	69.8	+1.4				
Thornville.	Lapeer.	70.1	12	68.3	-1.8				
Kalamazoo.	Kalamazoo.	69.5	13	69.3	-0.2				
Nevada.									
Carson City.	Ormsby.	69.0	9	69.4	+0.4				
New York.									
Humphrey.	Cattaraugus.	64.3	6	66.2	+1.9	66.2	1888	62.3	1886
Factoryville.	Tioga.	66.1	7	67.2	+1.1	67.8	1882	64.0	1883
Palermo.	Oswego.	67.0	35	65.4	-1.6	71.6	1877	62.1	1866
Ohio.									
Wauseon.	Fulton.	70.3	18	69.9	-0.4	72.8	1872	63.0	1870
Oregon.									
Albany.	Linn.	66.0	10	68.7	+2.7	68.7	1879-88	63.2	1880
Eola.	Polk.	64.8	18	62.9	-1.9				
Pennsylvania.									
Dyberry.	Wayne.	65.1	21	63.9	-1.2	71.7	1878	59.2	1866
Grampian Hills.	Clearfield.	67.7	25	67.6	-0.1	73.1	1881	62.1	1866
Wellsborough.	Tioga.	67.7	10	65.5	-2.2	71.3	1881	63.0	1883
South Carolina.									
Stateburg.	Sumter.	77.4	8	77.1	-0.3	79.7	1881	75.6	1887
Tennessee.									
Milan.	Gibson.	76.0	6	76.6	+0.6	90.0	1886-87	62.0	1884
Texas.									
New Ulm.	Austin.	82.5	17	81.3	-1.2	84.4	1873	79.4	1882
Vermont.									
Strafford.	Orange.	67.7	14	66.4	-1.3	70.6	1876	63.9	1885
Virginia.									
Bird's Nest.	Northampton.	77.0	19	77.4	+0.4	80.1	1878	72.0	1874
Wytheville.	Wythe.	70.5	23	74.3	+3.7	74.3	1888	66.1	1883
West Virginia.									
Helvetia.	Randolph.	67.0	12	67.8	+0.8				

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for August, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current

mean when the precipitation is below the normal, and subtracting when above.

In the lower lake region, New England, and the middle Rocky Mountain slopes the rainfall of August, 1888, averaged about 95 per cent. of the normal, and in the middle Atlantic states there was a slight excess, amounting to about 7 per cent. of the normal. In all other districts the departures from normal were more decided, and in some districts they were remarkably large. The most important feature of the month's rainfall was the very large excess in the Gulf States, Ohio and Missouri valleys, and southern Rocky Mountain slope. In the

Gulf States the rainfall was more than double the average, and the excess in the Ohio Valley was nearly as great. In the Missouri Valley and southern slope the percentages of excess were 38 and 54, respectively. The rainfall at New Orleans, La., amounted to nearly 23.00 inches, almost twice as much as the largest August rainfall previously recorded, and more than four times the August average of the last eighteen years.

In the districts where the monthly rainfall was deficient the percentages of average rainfall ranged as follows: Rio Grande Valley and southern plateau, from 30 to 35; Florida Peninsula, northern plateau, and north Pacific coast region, from 40 to 50; extreme northwest, about 55; middle plateau, south Atlantic states, and upper lake region, from 72 to 82. In California, where usually little or no rain falls during August, the present month has not been an exceptional one, only a few very light sprinkles occurring, and these were confined principally to the southern coast.

HAIL.

Descriptions of the more severe hail storms of the month are given under "Local storms." In addition to those given under that heading, hail is reported to have fallen in the various states and territories as follows: 1st, Fla., Oregon, Wyo. 2d, Ill., Mont., Ohio, Wyo. 3d, Nebr., S. C. 4th, Colo., Dak., Mich., Nebr. 5th, Iowa, Kans., Minn., Nebr. 6th, Kans. 7th, Nebr. 8th, Ind. Ty., La., Md., N. Y., Pa., Tenn., Tex. 9th, S. C., Va. 10th, Iowa. 11th, Colo., Iowa. 12th, Colo., Md., N. Y., Pa. 13th, Dak. 14th, Minn. 15th, Colo., Iowa, Nebr. 16th, Iowa, N. Y. 19th, Ala., Tex. 20th, Colo. 21st, Ala., Mich., N. Mex. 22d, Fla. 26th, N. Y. 27th, Ariz., Mass., N. Y., Vt. 28th, N. Mex. 29th, Colo. 30th, Colo., Mo., Wis. 31st, Ark.

SNOW.

The only stations reporting snowfalls during the month were Pike's Peak, Colo., on the 2d, 15th, 16th to 22d, 28th, 29th, 31st; total amount, 1.5 inches; and Fort Bridger, Wyo., where heavy snow fell during the 16th on the mountains thirty miles northeast of station.

SLEET.

Sleet is reported to have fallen at Pike's Peak, Colo., on the 12th, 26th, 27th, and at Mount Washington, N. H., on the 22d, 23d.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for August, 1883; (4) the departures of the current month from the average; (5) and the extreme monthly precipitation for August during the period of observations and the year of occurrence:

State and station.	County.	(1) Average for the month of Aug.	(2) Length of record.	(3) Total for Aug., 1883.	(4) Departure from average.	(5) Extreme monthly precipitation for Aug.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		Inches	Years	Inches	Inches	Inches		Inches	
Lead Hill.....	Boone.....	5.38	6	11.53	+6.15				
California.									
Sacramento.....	Sacramento.....	0.00	22	T.	+T.	0.01	1884	0.00	*
Connecticut.									
Southington.....	Hartford.....	4.83	19	3.13	+0.32	8.73	1871	0.40	1882
Florida.									
Merritt's Island.	Brevard.....	6.57	11	2.45	-4.12	15.77	1880	1.15	1883
Illinois.									
Golconda.....	Pope.....	4.06	11	4.48	+0.42				
Peoria.....	Peoria.....	3.12	32	2.30	-0.82	9.04	1863		
Riley.....	McHenry.....	3.68	27	4.23	+0.55				
Indiana.									
Logansport.....	Cass.....	3.26	34	0.98	-2.28	9.14	1876	0.17	1861
Vevay.....	Switzerland.....	3.25	21	8.04	+4.79	10.90	1879	0.54	1884
Iowa.									
Monticello.....	Jones.....	4.00	35	1.71	-2.29	8.30	1866	1.17	1866
Independence.....	Buchanan.....	3.73	13	2.58	-1.15	7.19	1870	1.12	1886
Kansas.									
Lawrence.....	Douglas.....	3.86	21	9.07	+5.21	9.07	1888	0.09	1883

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Aug.	(2) Length of record.	(3) Total for Aug., 1883.	(4) Departure from average.	(5) Extreme monthly precipitation for Aug.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Kansas—Cont'd.		Inches	Years	Inches	Inches	Inches		Inches	
Wellington.....	Sumner.....	2.91	10	5.15	+2.24	5.15	1888	0.61	1885
Independence.....	Montgomery.....	3.23	16	5.00	+1.77	7.46	1885	0.39	1874
Louisiana.									
Baton Rouge.....	E. Baton R'ge.....	5.85	25	12.30	+6.45				
Point Pleasant.....	Tensas.....	4.38	12	7.25	+2.87				
Maine.									
Gardiner.....	Kennebec.....	3.74	50	4.33	+0.59	8.48	1867	0.31	1883
Cornish.....	York.....	4.20	31	4.48	+0.28				
Maryland.									
Cumberland.....	Alleghany.....	3.14	17	8.00	+4.86	8.09	1882	0.31	1881
Massachusetts.									
Somerset.....	Bristol.....	4.49	18	5.35	+0.86				
Newburyport.....	Essex.....	3.67	10	5.35	+1.68	7.57	1887	0.75	1883
Michigan.									
Adrian.....	Lenawee.....	3.62	11	1.55	-2.07				
Thornville.....	Lapeer.....	3.60	12	1.81	-1.79				
Kalamazoo.....	Kalamazoo.....	2.76	13	0.63	-2.13	8.94	1885	0.42	1883
Nevada.									
Carson City.....	Ormsby.....	0.09	9	0.02	-0.07	0.62	1884	0.00	'80, '82, '86, '87
New York.									
Humphrey.....	Cattaraugus.....	4.58	6	4.09	-0.49	10.11	1885	2.57	1886
Factoryville.....	Tioga.....	2.62	7	3.44	+0.82	3.92	1885	1.46	1886
Palermo.....	Oswego.....	3.84	35	3.46	-0.38	6.40	1864	0.50	1870
Ohio.									
Wauseon.....	Fulton.....	2.94	16	1.95	-0.99	4.86	1886	1.12	1884
Oregon.									
Albany.....	Linn.....	0.44	10	0.00	-0.44	1.62	1881	0.00	'86-'88
Eola.....	Polk.....	0.37	18	0.00	-0.37				
Pennsylvania.									
Dyberry.....	Wayne.....	3.68	17	7.46	+3.78	8.77	1885	0.95	1883
Grampian Hills.....	Clearfield.....	4.04	19	8.19	+4.15	8.19	1888	1.66	1883
Wellaborough.....	Tioga.....	3.80	10	5.76	+1.96	7.45	1885	1.30	1879
South Carolina.									
Kirkwood.....	Kershaw.....	4.77	22	3.00	-1.77	14.75	1878	1.26	1877
Stateburg.....	Sumter.....	3.65	8	4.22	+0.57	5.74	1882	2.12	1886
Tennessee.									
Milan.....	Gibson.....	4.38	6	10.00	+5.62	10.00	1888	0.72	1885
Texas.									
New Ulm.....	Austin.....	3.11	17	4.34	+1.23	8.38	1878	0.09	1885
Vermont.									
Stratford.....	Orange.....	3.64	14	4.70	+1.06	7.90	1885	1.40	1882
Virginia.									
Bird's Nest.....	Northampton.....	4.20	19	3.95	-0.25	11.25	1874	0.20	1869
Wytheville.....	Wythe.....	3.37	24	3.67	+0.30	7.65	1882	1.38	1884
West Virginia.									
Helvetia.....	Randolph.....	4.37	12	4.67	+0.30				

* Frequently.

EXCESSIVE PRECIPITATION.

Table showing for the month of August monthly rainfalls of 10 inches, or more (in states where monthly rainfalls did not reach 10 inches the station reporting the maximum amount is given); rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.		Rainfall equaling or exceeding one inch per hour.			
	Year.	Am't.	Year.	Day.	Am't.	Year.	Day.	Time.
Alabama.		Inches			Inches			h. m. Inches
Birmingham.....	1883	11.00	1883	2	3.02			
Calera.....	1883	11.00	1883	2	4.90			
Citronelle.....	1888	10.00	1888	20	4.00			
Decatur.....	1885		1885	11	2.67			
Eufaula.....	1888	10.75	1888	22	2.80			
Do.....	1888		1888	30	4.22			
Fort Deposit.....	1888		1888	22	3.34			
Livingston.....	1888	10.80	1888	20	3.06			
Marion.....	1888	11.50	1884	1	3.30			
Mobile.....	1873	10.35	1876	4	4.02	1883	11	0.40 1.10
Do.....	1876	11.53	1879	13	3.91			
Do.....	1879	10.54	1879	22	3.19			
Do.....	1881	15.22	1881	2	6.70			
Do.....	1886	14.35	1881	4	3.02			
Do.....			1881	5	3.66			
Do.....			1883	6	3.30			
Do.....			1888	20-21	3.44			
Montgomery.....	1888		1888	30-31	2.58	1888	30	0.30 0.61
New Market.....	1888		1888	20	4.00			
Opelika.....	1887		1887	4	2.80			
Selma.....	1888	12.30	1888	21	5.00			
Scottsborough.....	1887		1887	5	2.50			
Troy.....	1888	10.97						
Uniontown.....	1888	11.69						
Arizona.								
Fort Apache.....			1883	3	2.57	1879	6	1.00 1.10
Do.....			1887	22-23	3.08	1886	29	0.45 1.35
Fort Grant.....								
Fort Verde.....	1876	12.08						

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Arkansas.									
Fort Smith	1888	Inches.	1884	14-15	2.97				
Helena	1888	10-10	1888	27	3.50				
Lead Hill	1888	11-53	1888	29-30	2.64				
Little Rock	1888	11-09	1879	43	4.04	1880	15	1 00	2.50
Do.			1888	29	3.31				
Malvern			1880	15-16	3.35	1886	1	1 10	2.60
Do.			1886	1	3.41				
Do.			1888	29	3.31				
Do.			1888	28	4.18				
Mount Ida						1882	23	1 00	1.00
Do.						1882	25	1 00	1.00
Pine Bluff			1888	30	3.00				
California.									
San Diego	1873	1-95							
Colorado.									
Denver						1877	11	0 25	1.00
Las Animas						1885	24	1 00	1.90
Pike's Peak	1881	11-29							
Connecticut.									
Bethel			1885	3	3.20				
Canton	1867	16.95							
Do.	1875	12.90							
Colebrook	1878	11-07	1878	4	6.67	1878	4	6 00	6.67
Hartford			1877	18	3.45				
Do.			1885	3-4	3.43				
Do.			1887	18	3.17				
Do.			1887	24	2.63				
Do.			1888	21-22	2.60				
Mystic			1877	25	4.00				
Do.			1879	18	3.00				
New Haven	1874	12-99	1873	14	2.97	1888	21	3 35	5.12
Do.			1874	8-9	8.73				
Do.			1877	13	2.75				
Do.			1879	17-18	5.12				
Do.			1885	3-4	4.51				
Do.			1886	1-2	2.57				
Do.			1888	21-22	2.60				
New London	1874	16-44	1874	9	2.80	1888	21	0 30	0.56
Do.			1879	18	4.65				
Do.			1880	4-5	2.56				
Do.			1885	24-25	4.11				
Southington			1888	21-22	3.55				
Trumbull	1874	10-94	1873	14-15	2.60	1874	7-8	6 15	7.30
Do.			1874	7-8	7.30				
Voluntown			1888	21	3.10				
Dakota.									
Deadwood						1875	8	1 05	1.70
Fort Abraham Lincoln			1876	22-23	3.36				
Fort Buford						1887	7	1 00	1.04
Fort Randall			1871	12-13	2.84	1875	25	1 00	2.30
Do.			1885	7	2.68	1888	5	0 30	1.32
Fort Stevenson			1876	22	3.00				
Fort Sully			1876	22	3.00				
Fort Totten			1874	27-28	2.82	1874	4	0 35	1.04
Do.			1880	25-26	5.10				
Huron			1886	19-20	2.49	1886	7	1 00	1.90
Do.						1886	19	1 00	1.62
Morrison			1881	1	3.20	1881	30	1 30	1.60
Parkston	1887	10-84	1877	29	3.60	1887	2	1 00	1.50
Webster			1884	19	3.54				
Yankton			1886	8-9	3.46				
Delaware.									
Dover	1879	12-45	1875	2-3	2.60				
Do.			1875	12	2.50				
Do.			1879	16-18	7.60				
Do.			1879	25-26	2.50				
Do.			1880	4-5	2.60				
Fort Delaware			1870	10-11	5.16	1888	31	0 50	3.00
Milford	1875	11-75							
District of Columbia.									
Washington City	1875	12-93							
Florida.									
Alta Monte Springs						1888	4	0 40	1.75
Do.			1888	22	2 00				2.00
Archer	1885	10-23							
Biscayne	1877	12-70							
Do.	1879	14-48							
Fort Barrancas	1878	30-73	1878	20	2.75	1878	20	1 45	2.75
Do.	1879	25-07	1878	3	3.75				
Do.	1880	10-16	1878	14	3.75				
Do.	1881	16-71	1878	29	9.75				
Do.	1882	18-74	1879	2	2.73				
Do.			1879	14	6.07				
Do.			1879	17	3.73				
Do.			1879	22	3.35				
Do.			1880	3	4.08				
Do.			1880	10	2.64				
Fort Brock	1882	12-28				1882	15	1 50	2.01
Cedar Keys	1880	19-45	1880	5-6	4.61	1884	5	0 26	1.00
Do.	1882	13-72	1880	29-30	3.14	1887	28	1 00	1.65
Do.	1885	10-09	1880	30-31	5.32				
Do.			1885	13	2.56				
Do.			1886	27	2.84				
Daytona	1877	10-77							
Do.	1880	10-51							
Fernandina			1883	8	2.84				
Jacksonville	1875	10-19	1872	5	2.64	1873	20	0 41	3.72
Do.	1881	10-23	1873	20	4.44	1874	25	1 06	2.80
Do.			1874	25	3.63	1876	14	1 06	2.80
Do.			1875	21	2.60	1881	3	1 10	1.25
Do.			1876	14-15	3.63				

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Florida—Continued.									
Jacksonville		Inches.	1880	1	3.30				
Do.			1883	25-26	2.59				
Do.			1885	26-29	3.08				
Do.			1886	26-27	3.01				
Jupiter			1888	16-17	2.96				
Key West			1875	27	3.15				
Do.			1882	13	2.65				
Do.			1886	6-7	2.86				
Manatee						1888	24	1 10	1.51
Merritt's Island	1879	13.11	1878	4	2.61	1885	13	0 50	1.89
Do.	1880	15.77	1879	30	4.75	1885	16	1 45	1.98
Do.	1885	10.28	1880	30	4.71	1887	29	1 00	1.31
Do.						1888	6	0 35	1.13
Pensacola	1881	18.52	1881	3	6.12				
Do.	1882	18.39	1881	4	3.94				
Do.	1885	11.74	1881	2	4.29				
Do.			1882	5	2.82				
Do.			1882	21	2.92				
Do.			1885	29	3.16				
Do.			1885	30	3.65				
Do.			1888	29-30	2.86				
Saint Marks			1879	1	6.41				
Do.			1879	26	4.46				
Sanford	1884	11.09							
Tallahassee			1888	22	3.50				
Georgia.									
Albany			1883	23	2.80				
Do.			1888	18	3.00				
Allapaha			1885	31	2.50				
Athens	1883	10.11	1885	30	3.60	1885	10	1 00	1.04
Do.			1887	2	2.60	1888	12	2 00	2.50
Do.			1888	12	2.50				
Atlanta			1885	30	4.22				
Augusta			1874	29-30	2.61	1884	7	2 00	2.11
Do.						1888	9	0 10	0.42
Do.						1888	21	0 10	0.24
Do.						1888	31	0 06	0.17
Columbus			1886	20	3.29				
Eastman			1887	5	3.02				
Forsyth			1877	8	2.50	1876	14	0 30	1.10
Do.						1879	3	0 40	1.27
Do.						1883	8	2 00	2.03
Fort Pulaski			1873	5	3.34				
Gainesville	1875	15.44	1875	15	3.00	1875	11	0 30	1.35
Do.			1879	4	1.60				
Do.			1879	18	2.58				
Do.			1879	26	2.80				
Do.			1887	1	4.47				
Do.			1887	27	2.80				
Griffin	1883	12.90	1883	8	10.38	1883	8	8 00	10.38
Do.			1888	21	3.04				
Jesup	1885	11.68	1883	3	2.74				
Do.	1888	11.97	1885	31	2.74				
Do.			1886	26	2.70				
Jointer's Island			1883	7	3.00				
Macon			1888	22	3.00				
McPherson Barracks	1874	10.00	1874	1	2.50	1872	24	1 00	1.66
Milledgeville			1885	26	3.06	1885	1	1 30	1.60
Do.			1886	2	3.37				
Millen			1888	22	2.55				
Newnan			1883	2	2.90				
Do.			1885	30	2.60				
Quitman			1880	30-31	5.00				
Savannah	1871	18.13	1871	18-19	8.12	1875	13	1 00	1.09
Do.	1872	12.31	1872	5-6	9.56	1870	21	1 05	3.40
Do.	1885	14.38	1876	21	3.40	1878	24	1 00	1.75
Do.			1881	27-28	4.83	1884	22	1 25	1.80
Do.			1883	7-8	4.03	1886	17	1 05	1.13
Do.			1885	26-27	3.00				
Do.			1885	30-31	4.73				
Thomasville	1880	12.73	1883	22	2.80				
Do.			1885	31	2.99				
Toccoa	1887	15.26	1887	1	3.96				
Do.			1887	2	4.53				
Do.			1887	8	3.92				
Washington			1886	18	4.25				
Way Cross	1884	10.12	1884	11	3.50				
Do.			1885	31	4.00				
Do.			1887	19	2.50				
Waynesborough	1888	10.56							
Idaho.									
Lewiston	1880	1.09							
Illinois.									
Anna			1879	14-15	4.26	1876	15	1 00	1.81
Do.			1879	23	5.08	1876	16	1 35	1.64
Augusta			1878	20	3.25				
Do.			1879	5	2.71				
Bunker Hill			1882	24	3.20	1882	15	0 30	1.23
Do.						1882	24	1 30	3.20
Cairo			1879	23-24	3.07				
Charleston	1882	23.04	1882	6	3.40				
Do.			1882	23	2.50				
Chicago	1885	11.28	1885	2-3	5.90	1875	21	1 00	1.00
Do.			1885	23-24	2.95				
Elmira			1878	20	3.97	1878	19	1 55	3.29
Do.			1882	29-30	3.26				
Geneseo			1887	11	3.07				
Jordan's Grove	1888	10.22	1888	20	3.55				
Louisville			1879	24	5.50				
Lyndon			1878	19	2.52				
McLeansborough			1885	24	2.53	1882	24	1 00	1.63

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.		Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.
<i>Illinois—Continued.</i>								
McLeansborough	1879	30	1882	21	1 00	1.25		
Mount Sterling	1871	4	1887	17	1 00	1.50		
Peoria	1888	16						
Riley	1886	28						
Rockford	1874	10						
Sandwich	1885	2						
Do	1888	2						
South Evanston	1881	31						
Springfield	1888	16						
Sycamore	1885	2						
Wilton Creek	1885	2						
Windsor	1885	2						
<i>Indiana.</i>								
Arlington	1879	24-25	1888	21	2.75			
Blue Lick	1888	11.39	1888	20-21	2.86			
Butlerville	1888	11.30	1888	20	3.25			
Dugonia Springs	1875	1	1873	28	1 00	1.00		
Indianapolis	1877	22-23	1874	10	0 30	1.22		
Do			1874	22	1 00	1.05		
Do			1885	24	1 00	1.00		
Do			1886	6	0 50	2.00		
Jeffersonville	1888	13.61	1888	17-18	3.88			
Do			1888	21	2.79			
Do			1888	26	3.16			
Mount Vernon	1888	11.16	1888	27	2.60			
Saint Meinrad's Abbey	1879	14-15	1888	20	2.90			
Salem	1888	20-21	1888	20-21	2.95			
Sealsville	1888	20-21	1888	20-21	3.18	1876	6	0 45
Vevay	1879	10.90	1888	30	2.60	1.25		
<i>Indian Territory.</i>								
Eufaula	1888	7.71	1888	30	2.60	1.01		
Fort Arbuckle	1883	6	1870	4	0 50	1.01		
Fort Reno	1883	13						
Fort Sill	1885	13						
Do	1888	24-25						
Tulsa	1888	29						
<i>Iowa.</i>								
Amasa	1877	26	1877	28	2 00	3.98		
Do	1885	23-24	1876	16	3 00	2.30		
Boonesborough	1876	12.44	1876	18	3.13			
Do	1876	28	1876	28	2.50			
Do	1877	27-29	1877	27-28	4.40			
Brookville	1878	20	1878	23-24	3.59			
Byron Township	1877	27-28	1885	1-2	2.83			
Cedar Rapids	1885	23-24	1885	23-24	5.27			
Clinton	1885	10.02	1884	2	4.72			
Do	1888	11	1888	11	5.50			
Cresco	1888	27-28	1888	19-20	2.52			
Cromwell	1885	1-2	1885	1-2	3.21			
Davenport	1885	22-23	1885	22-23	2.54			
Do	1885	23-24	1885	23-24	3.78			
Denison	1884	27-28	1876	17	2 00	2.30		
Denmark	1886	13	1886	24	1 00	1.40		
Des Moines	1881	31	1881	31	2.55			
Do	1888	10-11	1888	10-11	2.66			
Dubuque	1873	7	1873	7	1 00	1.50		
Do	1876	29-30	1876	16	0 45	1.50		
Do	1877	27-28	1887	10	1 00	1.00		
Do	1885	23-24	1888	3	1 00	1.00		
Elkader	1885	24	1888	3	1 00	1.00		
Fairfield	1880	23						
Glenwood	1888	10-11						
Guttenburg	1876	10.04	1876	1	4.25			
Ida Grove	1881	29-30	1881	29-30	3.50			
Keokuk	1879	5	1886	14	3.90			
Do	1886	14	1886	14	3.90			
Madison	1878	30	1882	5	1 00	1.30		
Do	1884	26-27	1884	26-27	4.50			
Monticello	1877	27-28	1882	24	0 50	1.00		
Mount Pleasant	1878	20	1881	26	0 15	1.40		
Nashua	1884	3						
Newton								
Osage	1888	10						
Osceola	1885	23						
Oskaloosa	1885	23-24						
Do	1888	14-15						
Rockford	1881	30	1876	16	0 35	1.10		
Sac City	1877	25						
Tabor	1879	0						
Washington	1885	22-23						
Do	1885	23-24						
Williamburg	1879	3-4						
<i>Kansas.</i>								
Belleville	1876	4	1876	21	2 00	2.70		
Cunningham	1888	27	1888	7	0 35	1.52		
Dodge City	1878	27	1878	27	1 12	2.01		
Do	1887	3	1887	3	1 00	1.58		
Ellinwood	1875	30	1875	30	1 00	3.30		
Fort Larned	1864	16-17	1863	9	1 00	1.00		
Do	1865	3	1864	13	1 00	1.50		

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Kansas—Continued.									
Fort Larned		Inches.	1865	10	2.50	1864	15	a. m.	Inches
Do.						1870	8	1 00	1.80
Fort Leavenworth			1866	6	3.18				2.06
Do.			1863	5-6	5.1c				
Do.			1868	11	3.70				
Fort Riley			1863	2-3	2.83	1868	5	1 00	1.60
Fort Scott			1864	15	2.55				
Hays	1880	11.34	1888	27-28	2.68				
Independence			1885	10	2.53				
Leavenworth			1872	11	3.18				
Do.			1885	11	3.56	1888	11	0 55	1.13
Do.			1888	11	2.93	1888	20	0 51	1.16
Manhattan						1880	24	0 30	1.32
Do.						1880	25	1 00	1.35
Do.						1885	24	0 30	1.32
Do.						1885	25	1 00	1.35
Morse	1888	11.23				1885	25	1 00	1.35
Topeka			1880	24-25	3.44				
Wichita			1888	7	2.62				
Wilson			1888	?	2.50				
Yates Centre			1888	7	3.25				
Kentucky.									
Ashland	1888	10.70	1888	21	2.60				
Bowling Green			1888	18	3.75				
Greensburg			1888	21-22	3.97				
Frankfort	1888	10.85	1888	21-22	3.97				
Lexington						1888	4	0 30	0.75
Louisville	1879	10.02	1879	15	2.86	1878	20	0 23	1.26
Do.	1888	10.53	1879	24	3.76	1879	5	0 40	1.68
Do.			1888	20-21	2.87	1888	1	0 25	0.54
Williamsburg			1888	18	2.70				
Louisiana.									
Amite City	1888	16.16	1884	27	2.50				
Do.			1888	15	2.52				
Do.			1888	20	3.85				
Do.			1888	29	3.06				
Baton Rouge	1888	13.30	1883	15	4.25				
Clinton	1888	14.05	1888	20	4.80				
Donaldsonville	1888	15.83	1888	20	3.62				
Franklin	1888	14.90	1888	20	4.10				
Lake Providence	1888	10.86	1888	15	3.29				
Mandeville	1888	19.61	1888	8	5.54				
Maurepas	1888	23.44	1888	21-22	7.75				
Mellville			1888	20	2.80				
Monroe			1888	28	3.60				
New Iberia	1888	12.27	1888	19	3.68				
New Orleans	1879	10.44	1873	20-21	4.08	1879	13	1 00	1.00
Do.	1888	22.74	1875	11-12	2.77	1880	3	0 50	1.17
Do.			1879	13-14	2.60				
Do.			1888	14-15	3.67				
Do.			1888	20	8.90				
Do.			1888	24	2.78				
Point Pleasant	1879	12.29	1879	9	3.02				
Do.			1879	22-23	6.73				
Do.			1888	20	2.50				
Port Eads	1888	13.48	1888	15	5.70				
Saint Joseph	1888	13.12	1888	15	6.02				
Saint Martinville	1888	11.60	1888	19	5.40				
Shreveport			1875	9	2.62	1875	9	0 56	1.00
Do.			1879	23	3.47				
Sugar Experimental Station	1888	17.50	1888	15	3.96				
Thibodaux	1888	15.56	1888	15	4.25				
Trinity	1888	10.70	1888	20	2.50				
Vidalia	1888	12.36	1888	15	3.93				
Maine.									
Buckfield			1885	13	5.75				
Fort Preble	1887	11.30	1885	4-5	2.85	1885	13	1 50	2.70
Orono			1885	13	2.70				
Do.						1877	7	2 10	2.32
Portland									
Maryland.									
Annapolis	1875	10.50	1873	13	4.36	1873	10	1 00	1.30
Baltimore			1885	3	3.35	1875	12	1 15	1.41
Do.			1887	22	1 10	1887	22	1 10	1.74
Do.			1888	5	1 00	1888	5	1 00	1.12
Do.			1888	8	1 00	1888	8	1 00	1.03
Cumberland			1888	21	2.68				
Fallston	1872	11.55	1885	3	5.96				
Fort Foote	1875	11.07							
Fort McHenry			1883	29	2.70				
Do.			1885	2-3	3.52				
New Market	1875	10.63	1875	29	2.72				
Saint Ingegoes	1875	11.35	1875	2	2.50				
Sandy Springs						1883	23	0 45	1.41
Woodlawn	1875	11.81				1875	11	1 00	2.10
Do.						1875	18	3 00	2.00
Woodstock College			1879	7	3.35	1887	22	1 31	1.56
Massachusetts.									
Boston	1872	10.68	1872	29-30	3.70	1878	9	2 30	3.27
Do.			1873	14-15	3.06				
Do.			1876	9	3.27				
Do.			1879	18-19	4.99				
Do.			1885	1	2.53				
Do.			1888	21-22	3.36				
Dudley			1888	21	2.60				
Fall River			1888	21-22	3.00				
Fitchburg	1872	10.09							
Lowell			1878	9	4.00				
Magnolia			1878	?	6.80	1876	?	3 30	6.80
Mendon			1878	4	1.00				

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Massachusetts—Continued.									
Milton.....		Inches.	1888	21-22	3.11			a. m.	Inches
Nahant.....			1888	20-21	3.65				
New Bedford..			1884	7-8	2.90				
Do.....			1887		3.60				
Provincetown..			1888	21-22	2.76				
Somerset.....			1874	8-9	5.14				
Do.....			1880	4-5	2.57				
Springfield....			1875	18	3.03				
Do.....			1879	18	4.28				
Do.....			1888	21	3.50				
Springfield Armory	1855	11.72							
Do.....	1856	11.72							
Do.....	1867	10.05							
Waltham.....			1878	6	2.50	1878	6	1 30	2.50
Wen Lake.....			1878	9	6.50	1878	9	0 00	6.50
Westborough..			1888	21-22	2.87	1887	2	6 47	6.92
Woods Holl....	1887	10.84	1879	18	5.11				
Do.....			1887	2	6.92				
Michigan.									
Alpena.....						1877	23	0 40	1.07
Do.....						1881	5	0 30	1.15
Do.....						1886	13	1 00	1.60
Detroit.....			1888	3-4	4.42	1872	13	1 00	1.06
Do.....						1875	21	0 30	1.15
Do.....						1877	31	0 45	1.78
Do.....						1878	31	0 45	2.48
Escanaba.....	1875	12.06	1875	5-6	2.68	1877	11	0 20	1.27
Do.....			1875	10-11	3.65				
Grand Haven...			1872	26	2.52	1872	24	1 00	1.00
Do.....			1880	24-25	3.20	1886	21	1 00	1.40
Do.....			1886	21	3.05				
Harrisonville..	1882	11.31	1882	5	2.80				
Do.....			1888	10	2.68				
Kalamazoo.....			1885	23-24	2.96				
Do.....			1886	21-22	2.52				
Manistee.....						1888	16	0 55	1.06
Marquette.....			1875	10-11	2.85				
Northport.....			1876	11	2.70				
Do.....			1879	22	3.55				
Otisville.....			1882	1	3.34				
Port Huron....			1882	1	3.45				
Traverse City..						1876	23	1 00	1.30
Minnesota.									
Duluth.....			1888	2-3	2.82				
Fort Ripley....			1865	8-9	3.50	1862	4	1 00	1.60
Do.....			1871	7	3.29	1863	7	1 00	1.05
Moorhead.....			1884	18-19	2.54				
Do.....			1884	19	2.57				
Saint Vincent..			1880	16	2.54	1884	1	1 00	1.00
Do.....			1883	18-19	2.83				
Do.....			1884	1-2	4.47				
Sylvan Park....	1873	11.00							
Mississippi.									
Aberdeen.....	1888	11.71	1888	20-21	7.50				
Batesville.....			1888	16	3.05				
Do.....			1888	20	2.53				
Brookhaven....			1877	21	3.50	1876	15	0 50	1.15
Do.....			1879	13	4.50	1876	29	1 05	1.40
Do.....			1888	20	2.80	1879	4	1 00	1.50
Biloxi.....	1888	19.08	1888	7	2.50				
Do.....			1888	20	3.12				
Do.....			1888	30	4.50				
Columbus.....			1888	30	2.55				
Fayette.....			1875	25	3.30	1877	31	0 55	2.00
Do.....			1880	8	2.60				
Greenville.....	1888	10.39							
Haslehurst....			1886	2	3.03				
Do.....			1888	20	3.00				
Hernando.....	1888	10.50							
Holly Springs..	1888	14.11	1868	17	3.00				
Do.....			1888	4	3.00				
Do.....			1888	20	2.90				
Jackson.....			1888	19-20	3.60				
Do.....			1888	31	2.66				
Lake.....			1884	1	2.75				
Do.....			1888	20	3.30				
Do.....			1888	31	2.51				
Meridian.....			1888	20	2.60				
Natchez.....	1888	14.03	1869	29	2.50	1869	29	2 30	2.50
Do.....			1885	17	2.58				
Do.....			1887	18	2.52				
Do.....			1888	15	3.03				
Do.....			1888	20	2.54				
University.....			1888	20	3.10				
Vicksburg.....	1888	11.10	1888	19-20	2.75				
Waynesborough.	1888	10.57							
Missouri.									
Conception.....			1888	6	2.85				
Do.....			1888	19-20	2.60				
Kansas City...						1888	11	0 55	2.14
Lamar.....			1886	3-4	3.73				
Do.....			1888	7	2.90				
Princeton.....			1888	10-11	3.50				
Saint Louis....			1848	15	5.05	1846	20	1 30	1.64
Do.....			1855	15	4.19	1847	4	1 30	1.76
Do.....			1863	9	3.05	1848	21	0 30	1.31
Do.....			1866	31	3.23	1848	15	0 15	5.05
Do.....			1868	28-29	2.55	1848	19	1 00	1.08
Do.....			1878	9-10	3.04	1848	20	0 30	1.30
Do.....						1851	3	1 00	1.60
Do.....						1853	3	1 15	1.51

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 1 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Missouri—Continued.		Inches.			Inches			h. m.	Inches
Saint Louis.....						1863	20	1 00	1.05
Do.....						1866	31	3 00	3.23
Do.....						1876	19	1 15	1.49
Do.....						1878	10	1 28	2.57
Do.....						1883	15	1 25	1.85
Steelville.....	1888	10.40							
Springfield.....			1888	7-8	3.20				
Montana.									
Carroll.....			1874	10-11	4.00				
Fort Assinaboine.....						1883	11	0 50	1.23
Fort Ellis.....						1883	10	0 30	1.50
Fort Maginnia.....	1887	4.54	1887	30-31	2.95	1888	26	0 25	0.87
Fort Missoula.....						1875	12	0 30	1.17
Nebraska.									
Clear Creek.....						1883	13	0 35	1.17
De Soto.....						1876	6	2 15	2.40
Do.....						1876	17	1 45	1.85
Do.....						1880	26	2 00	2.18
Falls City.....			1888	5-6	2.84	1883	17	1 05	1.82
Do.....						1888	5	1 00	1.05
Do.....						1888	15	1 05	1.25
Do.....						1888	20	1 10	1.18
Freemont.....						1883	17	1 40	2.00
Fort McPherson.....						1878	14	0 45	1.20
Genoa.....			1876	17	2.50				
Howard.....			1881	*	3.70	1877	25	1 00	1.10
Lincoln.....	1883	11.25	1883	11	6.50				
Do.....			1883	17	4.25				
Do.....			1888	20	2.73				
Norfolk.....	1875	16.10	1875	24-25	3.75				
Do.....			1875	27	3.05				
Do.....			1875	26-27	6.70				
Omaha.....	1869	13.11	1869	30	3.60				
Do.....			1869	34	3.90				
Do.....			1876	17-18	2.57				
Do.....			1884	12-13	2.81				
Plattsmouth.....	1888		1875	26-27	6.70				
Do.....			1876	13-14	3.75				
Red Cloud.....						1874	22	1 00	1.00
Richmond.....			1876	19	3.00				
Nevada.									
Winnemucca.....	1878	0.50							
New Hampshire.									
Auburn.....	1878	10.14	1877	27	3.00	1877	27	0 35	3.00
Do.....			1878	9	3.00	1878	6	1 30	1.88
Do.....			1887	18	3.27				
Concord.....						1887	11	0 50	1.02
Contoosook.....			1885	3-4	2.75				
Dunbarton.....			1877	29	2.57				
Do.....			1879	8	3.12				
Hanover.....			1850	4-6	5.64	1842	12	1 00	1.10
Mount Washington.....	1877	11.11							
Do.....	1878	11.35							
Do.....	1881	11.90							
Do.....	1885	14.26							
Do.....	1888	15.31							
Woodstock.....	1885	12.92							
New Jersey.									
Atlantic City.....	1879	14.67	1882	16	4.79				
Do.....	1882	14.87	1882	27	5.16				
Barnegat City.....	1879	12.33							
Beverly.....			1888	21	2.75				
Bridgetown.....			1888	21	3.20				
Cape May.....	1875	10.16	1879	18	8.46				
Do.....	1879	16.58							
Do.....	1882	10.29							
Freehold.....			1876	21	2.65				
Do.....			1879	16-18	7.56				
Gillette.....			1888	21-22	3.65				
Hanover.....			1888	21-22	3.84				
Highland Park.....			1888	21-22	2.90				
Hopewell.....			1888	21-22	2.58				
Jersey City.....			1878	1	3.08				
Lambertville.....	1843	12.26	1843	20-22	7.12	1844	6	1 00	1.50
Do.....			1845	22-23	4.37				
Do.....			1846	17	2.52				
Do.....			1857	10	4.24				
Do.....			1858	11	3.57				
Do.....			1860	13-14	3.06				
Do.....			1864	3	2.80				
Do.....			1888	23	2.80				
Little Egg Harbor.....	1882	12.88							
Locktown.....			1888	21	4.05				
Moorestown.....			1879	17	2.78				
New Brunswick.....	1881		1887	2	4.62	1887	2	1 00	4.50
Do.....			1888	21-22	3.08				
Newark.....			1878	16	3.04				
Ocean City.....	1888		1888	18-19	3.80				
Paterson.....			1888	21-22	4.40				
Plainfield.....	1888	10.50	1888	21-22	5.72				
Sandy Hook.....	1879	12.44	1879	18	6.38				
Somerville.....			1888	21	3.23				
South Orange.....			1878	6	3.74				
Do.....			1888	21	4.25				
Tenafly.....			1888	21	3.71				
Trenton.....	1879		1879	17-18	4.58				
Do.....			1888	21	3.33				
Union.....			1888	21	4.05				
New Mexico.									
Las Vegas.....						1888	17	1 00	1.02
Santa Fe.....	1881	6.28							

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 1 inch, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equalling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>New Mexico—Continued.</i>		<i>Inches.</i>			<i>Inches</i>				
Silver City.....						1878	23	1 45	2.00
<i>New York.</i>									
Albany.....						1878	2	0 20	1.75
Ardena.....				25-28	4.00				
Boyd's Corners.....			1888	27	3.11				
Buffalo.....	1885	10.63	1871	22	3.21	1880	19	0 55	1.00
Do.....			1879	18	3.71				
Do.....			1885	21-22	2.06				
Cooper Union.....			1875	12	2.63				
Do.....			1876	17	2.50				
Flushing.....			1878	1	3.65	1878	1	3 30	3.65
Fort Columbus.....			1888	20-21	3.57				
Fort Hamilton.....			1871	25-26	2.60				
Do.....			1879	18	5.00				
Do.....			1875	12	2.30				
Fort Niagara.....						1877	15	1 00	1.00
Fort Wadsworth.....			1874	6-7	2.60				
Madison Barracks.....			1888	12-13	3.81				
New York City.....	1875	10.43	1872	29-30	2.50	1875	16	0 45	1.25
Do.....			1873	20-21	2.04	1888	21	1 45	2.15
Do.....			1875	12	3.34				
Do.....			1878	1	2.85				
Do.....			1878	6	2.66				
Do.....			1888	21-22	3.93				
Oneida.....			1875	18	2.67				
Oswego.....			1879	16	3.14				
Do.....			1879	16-17	2.54				
Do.....			1888	13	2.55				
Rochester.....			1871	27	3.01				
Do.....			1879	16	2.65				
Do.....			1886	30	3.34				
Setauket.....			1885	3	3.81				
Stapleton.....	1879	10.57	1875	12	4.00				
West Point.....			1888	21	4.34				
White Plains.....			1875	13	2.50				
Do.....			1877	13	3.60				
Do.....			1885	3	3.10				
Do.....			1888	21	2.62				
<i>North Carolina.</i>									
Cape Lookout.....						1878	30	1 00	2.05
Charlotte.....	1880	10.57	1880	3-4	2.61	1880	16	1 00	1.00
Do.....			1880	4-5	3.36				
Do.....			1884	11-12	3.38				
Do.....			1886	6	3.19				
Do.....			1887	26-27	3.07				
Elisworth.....	1880	26.33	1880	3	6.00	1880	4	3 30	9.00
Do.....			1880	4	9.00				
Do.....			1880	16	2.50				
Fayetteville.....	1879	13.25	1879	17	3.00				
Do.....			1879						
Franklin.....	1879	12.45	1879	2	5.90				
Goldborough.....	1875	17.45	1883	16	3.20				
Do.....	1876	17.61	1884	5	2.65				
Do.....	1885	14.25	1885	30	3.57				
Do.....	1887	14.36	1886	18	3.05				
Do.....			1887	27	4.00				
Greenville.....			1877	2-3	5.53				
Hessborough.....			1879	17	2.90				
Hattersville.....	1878	10.07	1880	23	9.14	1876	27	1 50	1.58
Do.....	1880	16.30	1882	15	5.37	1880	23	1 00	1.00
Do.....			1887	20	2.50				
Kitty Hawk.....	1875	12.48							
Do.....	1880	11.10							
Do.....	1883	12.39							
Do.....	1887	12.04							
Lincolnton.....	1887	11.11							
Do.....						1887	1	3 00	4.66
Lenoir.....			1879	13-16	5.50				
Lumberton.....	1883	12.50	1883	11	6.20				
Do.....	1886	10.31	1886	19	4.37				
Do.....			1886	27	2.90				
Murphy.....	1874	13.20	1874	7-8	2.80				
New Bern.....	1887	11.88							
Portsmouth.....	1878	11.76	1879	9	3.69				
Raleigh.....	1887	10.80	1885	30	3.01	1887	14	0 45	1.05
Do.....			1887	27	4.16				
Do.....			1888	20	2.91				
Reidsville.....	1887	10.36	1887	3	2.60	1888	9	2 00	2.60
Salisbury.....	1887	16.14	1887	2	2.91	1888	13	0 10	0.50
Do.....			1887	27	3.68	1888	9	2 00	0.50
Smithville.....	1887	12.53	1888	9	2.60				
Do.....			1888	13	5.50				
Statesville.....	1887	13.25	1887	1-3	6.51				
Wash Woods.....	1886	13.09							
Do.....	1887	11.87							
Weldon.....			1878	12-13	4.83	1874	8	1 00	1.00
Wilmington.....	1872	11.15	1872	6	5.42	1876	6	1 00	1.00
Do.....			1877	9	2.84	1877	9	1 00	1.25
Do.....			1879	17	4.69	1879	12	1 00	1.80
Do.....			1879	18	4.21	1880	9	1 00	1.25
Do.....			1881	26	2.60				
Do.....			1883	25	3.72				
Do.....			1884	8	2.65				
Do.....			1887	3	5.13				
Do.....			1887	4	2.64				
<i>Ohio.</i>									
Bellefontaine.....			1880	19-20	5.28				
Bethel.....	1879	11.60	1879	24	5.24	1880	5	1 00	1.00
Cincinnati.....	1879	11.72	1879	24-25	2.87	1871	11	1 45	2.00
Do.....			1885	6-7	2.68				
Clarksville.....	1880	10.13							
Cleveland.....			1871	25-26	3.14	1872	14	0 45	1.10

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 1 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Ohio—Continued.									
Cleveland		Inches.	1878	31	2.73	1872	31	A. M.	Inches.
Do.			1879	15-16	2.59				
College Hill	1876	10.25	1879	15	3.00	1882	27		1.00
Do.			1880	20-21	3.75				
Columbus			1880	19-20	3.64	1880	19	1 00	1.25
Do.						1883	26	0 40	1.20
Demon			1888	20-21	4.20				
Gracey			1888	21	4.00				
Hiram						1885	2	2 00	2.07
Kenton			1875	1	3.71				
Do.			1875	2	3.25				
Marietta	1888	11.55							
Marquette						1877	14	0 50	1.13
Mount Auburn	1879	12.10	1880	23	2.95	1879	6	1 00	2.34
Do.						1880	26	0 30	1.53
Portsmouth			1850	9	2.60	1870	19	1 00	1.25
Do.			1855	1	3.00				
Do.			1882	18	3.60				
Do.			1888	20-21	3.18				
Sandusky			1879	15-16	2.69	1882	2	0 45	1.40
Do.			1882	3-4	2.50	1882	4	1 15	1.07
Do.						1882	6	0 50	1.22
Westerville			1888	31	2.87				
Oregon.									
Portland	1881	2.11							
Pennsylvania.									
Alleghany Arsenal			1864	3	2.50				
Altoona			1888	21-22	4.30				
Beaver			1888	31	3.20				
Bethlehem			1888	31	4.50	1865	6	1 30	1.92
Carlisle			1860	12-13	3.00	1867	10	1 45	3.00
Do.			1867	10	3.00	1878	3	2 00	2.40
Do.			1871	7-8	4.90				
Do.			1871	25-26	2.68				
Do.			1876	12	3.00				
Do.			1888	31	3.86				
Catawissa			1888	22	3.78				
Chambersburg			1888	21	2.70				
Doylestown			1888	31	3.92				
Drifton	1888	11.27	1888	31	3.98				
Easton			1888	4	3.34				
Do.			1888	21-22	3.94				
Erie			1879	15-16	3.11	1873	25	2 00	3.00
Do.			1885	23-24	2.71				
Fallsington			1882	27	2.58				
Do.			1883	2	4.53				
Do.			1885	3	3.38				
Frederick			1888	31	3.93				
Germanstown			1885	3	3.59				
Gerardville			1888	31	5.65				
Grampian Hills			1888	17	3.10				
Do.			1888	21-22	2.60				
Holidaysburg			1888	21	2.07				
Harrisburg			1888	21-22	4.70				
Huntingdon			1888	31	4.80				
Hulmeville						1877	15	1 25	1.90
Do.						1880	25	0 35	2.20
Indiana	1888	10.65	1888	31	3.70				
Johnstown			1888	31	4.49				
Kutztown	1888	10.95	1888	31	5.07				
Lansdale			1888	31	3.57				
Lebanon			1888	31	4.70				
Lock Haven			1888	31	3.60				
McConnellsburg			1888	31	3.07				
New Bloomfield			1888	31	2.65				
Newtown	1841	10.69	1839	19	4.70				
Do.			1840	13	3.39				
Do.			1841	11	3.16				
Ottaville			1888	31	3.85				
Philadelphia	1873	11.49	1873	12-13	5.21	1874	9	1 00	1.30
Do.			1874	8-9	4.08	1878	1	1 00	1.43
Do.			1879	17-18	2.71	1880	25	1 00	1.05
Do.			1882	27-28	3.70				
Do.			1883	2	2.86				
Do.			1885	3	2.50				
Phillipsburg			1888	31	3.57				
Pittsburg			1871	25	2.92	1874	12	0 40	1.00
Do.			1879	25	2.59	1883	28	1 00	1.00
Do.			1888	16-17	2.50	1884	16	0 35	1.85
Do.			1888	21-22	3.65				
Point Pleasant			1888	31	3.95				
Pottstown			1888	31	3.80				
Quakertown			1885	3	4.07				
Do.			1888	21-22	4.04				
Reading			1875	13	3.25				
Do.			1888	21-22	4.52				
Selins Grove	1888	10.12	1888	31	5.20				
Shamokin			1888	31	4.03				
Scotchville			1888	31	4.72				
Smith's Corner			1888	31	4.00				
State College						1888	12	0 45	1.57
Somerset			1888	31	4.50				
Tamaqua						1884	21	0 51	1.38
Tioga						1875	18	1 00	1.50
Uniontown	1886	10.23	1888	31	4.53				
Wellsborough	1885	15.25	1882	33	2.70	1880	11	0 30	1.60
Do.			1885	13	3.78	1889	16	0 43	1.06
Do.			1885	24-25	5.55	1882	23	1 15	2.70
Do.						1885	13	1 20	3.76
Do.						1885	21	0 30	1.95
West Chester			1874	8	2.50				

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.		Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.
<i>Pennsylvania—Continued.</i>		<i>Inches.</i>			<i>Inches.</i>		<i>h. m.</i>	<i>Inches.</i>
York	1888		21		3.75			
<i>Rhode Island.</i>								
Block Island	1884	6.52				1881	3	1 10
Providence						1878	6	1 00
<i>South Carolina.</i>						1878	6	0 36
Aiken	1867	10.70	1878	14	5.13	1878	14	1 00
Do.	1887	11.30						
Anderson			1887	8	2.53			
Charleston	1871	14.97	1871	19	4.00	1874	31	0 50
Do.	1873	12.94	1871	20	2.98	1878	13	1 00
Do.	1878	10.73	1873	5	3.54	1885	31	1 00
Do.	1883	10.05	1874	29-30	4.70			
Do.	1885	19.18	1876	17	2.98			
Do.			1878	14	5.41			
Do.			1881	27	4.69			
Do.			1882	27	3.50			
Do.			1883	8	4.88			
Do.			1885	25-26	4.32			
Do.			1885	30-31	5.89			
Cheraw	1887	10.20	1886	18	2.75			
Chester	1887	11.93	1887	19	2.66			
Do.			1887	27	2.90			
Columbia			1872	12	2.90	1872	12	1 35
Florence			1885	2	3.10			
Do.			1885	25	3.28			
Fort Moultrie			1862	12	3.39			
Do.			1862	14	2.30			
Greenville	1867	12.12	1887	2	2.51			
Hardeeville	1885	17.01	1884	5	2.55			
Do.			1885	25	3.00			
Do.			1885	31	6.00			
Hilton Head			1863	17-18	2.50			
Do.			1863	26-27	2.60			
Jacksonborough	1885	10.71	1885	25	2.98			
Do.			1885	31	3.39			
Kingsree	1885	10.19	1885	3	3.24			
Kirkwood	1869	10.22						
Do.	1878	14.78						
Saint Mathews			1881	27	2.61			
Spartanburg	1888	15.26	1888	3	3.00	1885	2	1 30
Do.			1888	10	6.00			
Statesburg						1881	7	1 15
Do.						1884	0	50
Do.						1888	9	1 37
Yemassee	1883	11.17	1883	18	5.01			
Do.	1886	14.72						
<i>Tennessee.</i>								
Ashwood	1888	11.93	1888	31	5.44			
Bolivar	1888	10.70	1888	18	3.00			
Do.			1888	31	2.50			
Chattanooga						1882	27	1 10
Dyersburg	1888	11.75	1888	21	3.91			
Hohenwald	1888	10.87						
Knoxville			1872	14-15	2.54	1872	14	0 45
Do.			1874	28-29	2.60	1872	15	0 35
Do.						1878	11	0 50
Do.						1884	22	1 00
Do.						1887	6	1 00
Do.						1887	6	1 00
Memphis	1888	10.44	1873	1	2.94	1873	13	1 00
Do.			1874	21-22	3.93	1880	10	0 47
Do.			1877	6-7	3.69	1885	2	0 40
Do.			1886	1-2	3.27	1888	20	2 08
Do.			1888	20-21	4.70			
Milan	1888	10.00	1883	15	3.05			
Do.			1887	15	2.50			
Do.			1888	20	2.50			
Nashville			1876	24	2.65	1876	24	0 58
Do.						1879	23	0 46
Do.						1883	1	0 45
<i>Texas.</i>								
Austin			1870	7-8	3.66	1883	20	1 15
Do.			1886	20	3.76			
Fort Brown						1860	18	1 30
Brownsville	1880	16.58	1879	13-14	2.64			
Do.			1880	11-12	7.82			
Do.			1880	12-13	4.89			
Camp Verde	1860	18.96						
Do.	1867	12.81						
Cedar Hill			1888	26-27	3.00			
Clarksville			1875	9	2.50	1875	9	2 30
Do.			1879	8	2.50	1884	14	0 53
Do.			1884	4	2.82			
Cleburne	1887	16.30						
Colorado Camp	1860	14.39	1860	26-28	7.57			
Colorado City						1888	27	1 45
Comfort			1886	20-21	3.12			
Columbia			1888	25	2.55			
Corsicana			1887	30	5.02			
Corpus Christi						1888	19	0 10
Dallas	1888	13.62	1886	30	3.07			
Do.			1887	30	4.00			
Do.			1888	19	4.04			
Do.			1888	24	4.04			
Decatur			1888	18	2.87			
Edinburg			1888	30	3.16			
Fort Clark	1870	10.10	1870	7	3.20			
Do.			1870	9	3.00			
Fort Concho	1882	14.03	1882	23-24	3.67			
Fort Davis			1879	15	2.50	1879	15	1 36
Do.			1884	26	3.25			

Table showing for the month of August, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Texas—Continued.									
Fort Elliott		Inches.			Inches	1884		A. m.	Inches
Do.						1886	5	1 00	1.06
Fort Mason	1860	13.90					3	0 33	1.35
Fort McKavitt			1876	10-11	3.24				
Do.			1879	8-9	3.22				
Gallinas			1888	25	4.96				
Galveston	1876	10.19	1873	20-21	4.13	1871	17	0 25	1.50
Do.	1888	14.46	1874	18-19	2.72	1873	8	1 00	1.38
Do.			1876	2	3.47	1876	2	1 20	1.68
Do.			1879	16-17	3.02	1888	24	3 00	4.50
Do.			1882	4-5	2.58				
Do.			1888	24	5.94				
Do.			1887	30-31	2.65				
Granbury	1888	15.67	1888	26	10.15				
Huntsville			1885	14	3.00				
Luling			1886	21	2.50				
Do.			1888	27	3.40				
Mesquite	1875	12.41	1875	10	2.50	1874	7	1 00	1.00
Do.	1888	10.70	1888	26	4.35	1874	7	0 30	1.00
Do.						1875	9	0 30	1.05
Do.						1875	10	0 30	2.50
Do.						1875	11	0 15	2.12
Palestine			1882	25	2.92	1888	13	0 57	1.28
Ringgold Barracks	1879	10.82	1879	11-12	5.05				
Do.			1879	15-16	2.90				
Rio Grande City	1879	11.75	1877	8	2.65				
Do.			1879	10-11	5.95				
Do.			1879	11-12	3.52				
Do.			1879	15-16	2.95				
Do.			1880	12-13	2.90				
Do.			1881	8-9	3.16				
San Antonio	1860	11.38	1886	20-21	4.54	1886	20	1 00	1.50
Do.			1887	23-24	2.53	1887	23	1 00	1.20
Do.			1888	24-25	4.22	1888	26	1 00	1.12
Do.						1888	26	0 40	0.90
Do.						1888	27	0 25	0.90
Sour Lake			1888	24	3.00				
Tyler	1888	17.85	1887	26	3.15				
Do.			1887	30	3.00				
Do.			1888	26-28	11.35				
Waco			1887	30	4.50				
Weatherford			1888	25-26	5.83				
Utah.									
Frisco	1885	3.96							
Vermont.									
Burlington	1872	9.62							
Virginia.									
Accotink	1875	14.41	1875	28	2.50				
Boonsborough			1876	13	5.25				
Cape Henry	1887	16.82							
Capeville	1875	12.20							
Comorn	1875	12.06	1875	16-17	2.95				
Dale Enterprise	1882	10.50	1886	6-7	2.60				
Do.			1888	11	3.66				
Dover Mines			1880	30	2.70	1878	17	0 40	1.40
Fort Monroe			1878	16	3.60	1878	16	2 13	3.60
Do.			1879	18	5.00	1879	18	4 00	5.00
Do.						1887	17	2 00	2.40
Hampton	1875	14.41	1875	7-8	2.63				
Do.			1875	10	2.70				
Do.			1875	29	5.67				
Johnstown	1875	11.25	1875	7-8	4.90				
Do.	1879	10.85	1875	23	2.80				
Do.	1880	10.00	1879	18	7.70				
Lynchburg	1873	10.03	1876	3	3.17	1888	9	0 45	1.32
Marion						1886	14	1 00	1.00
Do.						1887	22	1 00	1.40
Mount Solon			1879	17	2.80				
Norfolk	1875	10.37	1875	7-8	3.31	1876	15	0 48	1.35
Do.	1886	10.23	1879	9	2.75	1888	20	0 10	2.48
Do.			1879	18	6.03				
Do.			1880	4	3.28				
Do.			1880	5-6	3.41				
Do.			1886	17-18	3.19				
Do.			1888	30	3.29				
Woodlawn	1875	12.20	1875	27-28	2.50				
Wytheville						1887	22	1 00	1.59
Washington.									
Tatoosh Island	1884	5.49							
West Virginia.									
Buckhannon			1888	18	2.74				
Helvetia	1882	12.60							
Parkersburg			1888	20-21	2.66				
Westborough			1879	25	2.87				
Wisconsin.									
Embarras			1876	17-18	2.60				
Do.			1877	28	4.00				
Do.			1877	18-19	2.70				
Do.			1886	20-21	2.65				
La Crosse			1877	27	2.55				
Milwaukee	1885	7.39	1876	29	3.65				
Phillips			1888	3	4.00				
Wyoming.									
Cheyenne	1878	2.50							

Mississippi and Missouri valleys, where, in August, they occur less frequently than in either of the two preceding months. They have been most numerous along the Atlantic and east Gulf coasts, and from the records of the stations where they have occurred most frequently it is shown that such rainfalls may not be expected to occur during August in any portion of the districts named at shorter intervals than three or four years; many stations show that they occur with less frequency, and at a few of some of the older established stations no such monthly rainfalls have ever been recorded in August. The following are some of the remarkable monthly rainfalls shown by the August records: Fort Barrancas, Fla., 30.73, 1878, and 25.07, 1879; Maurepas, La., 23.44, 1888; New Orleans, La., 22.74, 1888; Charlestown, Ill., 23.04, 1882; Ellsworth, N. C., 28.33, 1880. The fall of 12.08 inches at Fort Verde, Ariz., in 1876, though much less than that for many of the stations mentioned is not less remarkable, as such a fall is very unusual for that part of the country. On the north Pacific coast the largest August rainfall was that of 5.49, at Tatoosh Island, in 1884; in California, the largest was 1.95, at San Diego, in 1873.

Daily rainfalls amounting to, or exceeding, 2.50 inches in the month of August have seldom occurred west of the one hundredth meridian; between that meridian and the Mississippi River, and also in the Lake region, they occur with much less frequency than in other districts to the eastward. The southern New England and New Jersey coasts and the south Atlantic and east Gulf states have been most commonly subjected to excessive daily rainfalls, the stations reporting the greatest number showing an average of about one for each period of two years. From records at stations on Pensacola Bay, Fla., it appears that that vicinity has been more fre-

quently subjected to excessive daily rainfalls than any other part of the United States. During 1879, 1880, and 1881 daily rainfalls exceeding 2.50 inches occurred at Fort Barrancas ten times in August, and at Pensacola similar rainfalls occurred eight times from 1881 to 1888. The following are some of the largest daily falls on the records of the Signal Service: 10.38, Griffin, Ga., 8th, 1883; 9.75, Fort Barrancas, Fla., 29th, 1878; 9.56, Savannah, Ga., 5-6th, 1872; 9.14, Hatteras, N. C., 23d, 1880; 9.00, Ellsworth, N. C., 4th, 1880.

Hourly rainfalls of 1.00 inch or more have occurred with decidedly less frequency in August than in the preceding month. In August they have been most numerous in the central valleys, and in the Atlantic coast and Gulf states, but there are numerous stations in these districts showing no such rainfalls. A record covering about half a century at Saint Louis shows that in that vicinity hourly rainfalls reaching this limit have occurred in August about once in four years, and while some stations with short records show a higher rate of frequency the records in general indicate that but few localities have been subjected to these falls more frequently than is represented by the Saint Louis records. Some of the most remarkable are as follows:

Station.	Year.	Date.	Actual fall.	Duration.	Rate per hour.
			Inches.	h. m.	Inches.
Saint Louis, Mo.	1848	15	5.05	0 15	20.20
Norfolk, Va.	1868	20	2.48	0 10	14.88
Providence, R. I.	1876	6	3.50	0 36	5.83
Osage, Iowa.	1881	26	1.40	0 15	5.60
Jacksonville, Fla.	1873	20	3.72	0 40	5.58
Auburn, N. H.	1877	27	3.00	0 35	5.16
New Brunswick, N. J.	1887	3	4.50	1 00	4.50
Aiken, S. C.	1878	14	4.00	1 00	4.00

WINDS.

The most frequent directions of the wind during August, 1888, are shown on chart ii by arrows flying with the wind. They were westerly and southwesterly in the Lake Region and New England; from southeast to southwest on the south Atlantic coast, and in the Gulf States; mostly from west on the Pacific coast, and variable in other districts.

HIGH WINDS (in miles per hour).

No maximum velocity of fifty, or more, miles per hour, other than those given in the table of miscellaneous meteorological data, are reported, except at Mount Washington, N. H., 90, nw., 10th; 88, nw., on 15th and 25th; 96, w., 27th; 87, w., 28th; 103, nw., 29th; and at Fort Bridger, Wyo., 50, sw., 18th.

LOCAL STORMS.

1st. Missouri.—Saint Louis: the thunder-storm which occurred between 4.15 and 5.18 p. m. was accompanied by high winds, which reached a maximum velocity of fifty-one miles per hour; considerable damage was done to trees, fences, etc.

1st-2d. Minnesota.—Saint Cloud, Stearns Co.: a remarkably severe storm prevailed during the night. The roads in the surrounding country were badly washed, and much damage was done by lightning.

2d. Minnesota.—Duluth: very heavy rain began at 8.15 p. m. and ended during the night; the damage done by washouts in this city and vicinity is estimated at \$10,000.

3d. Kansas.—Topeka: during the thunder-storm which occurred in the evening the wind attained a velocity of sixty miles per hour. Abilene, Dickinson Co.: between this place and Hope a large number of buildings were blown down by the storm which occurred during the evening. **Wisconsin.**—La Crosse: a very severe thunder-storm, accompanied by high wind and heavy rain, prevailed between 1.46 and 4.30 a. m. The electrical display during the storm was very remarkable.

4th. Dakota.—Huron, Beadle Co.: two destructive hail-storms occurred during the afternoon, the first about 3.30, and

moved in a northeasterly direction; the second, at 6 p. m., moved first to the southeastward and then eastward. Several barns and small houses were destroyed by the last-mentioned storm. At Huron there was heavy rain and large hail, accompanied by thunder and lightning, in the afternoon, the wind blowing at the rate of forty-five miles per hour, and proving very destructive. Concerning the storm in the vicinity of Huron the "Daily Huronite" of the 6th states:

The loss in the immediate neighborhood of Huron amounts to but little, but through a strip of country six or seven miles south, thence extending east and north, the damage is great. Through six or seven townships in this county the crops are badly beaten down. The storm seems to have skipped about in a peculiar manner, not by any means destroying all in its course, but taking some crops entirely, damaging some, and leaving many almost unharmed.

Severe and destructive hail-storms also occurred in Kingsbury and Moody counties. At Spring Lake, Kingsbury Co., about 5.30 p. m. a tornado did much damage to buildings and crops. **Iowa.**—The "Dysart (Iowa) Reporter" states that a very destructive hail-storm occurred in Grundy and Tama counties about dusk. Within the path of the storm, which was about five miles in width and twenty miles in length, crops were completely ruined, and many houses damaged. **Kansas.**—Dodge City: during a thunder-storm between 6.15 and 7 p. m. the wind suddenly increased in velocity from fourteen to sixty miles. Considerable damage is reported to have been done by the storm at Spearville, twenty miles east of Dodge City. **Michigan.**—Detroit: a thunder-storm, accompanied by high wind and heavy rain, occurred during the night; much damage was done by the flooding of basements; the local papers report the loss from the storm at \$30,000. Hail of unusual size fell two miles northeast of station during the storm. **North Carolina.**—Marion, McDowell Co.: a severe local storm, accompanied by hail, visited this place in the afternoon; a large warehouse was completely demolished and several other buildings were damaged.

5th. Illinois.—Cairo: the thunder-storm which occurred in the afternoon was accompanied by heavy rain and high wind; maximum velocity, forty-five miles per hour from the west; this was the most destructive storm that has visited this section for several years, and caused much damage to property in the city and on the river. Telegraphic communication was interrupted. Damage to property is estimated at \$5,000. The storm is reported to have been very destructive along the line of the Illinois Central Railroad, between this city and Duquoin, Ill. At Charleston, Mo., about twelve miles west of this city, many trees were blown down and crops damaged; a freight car on the Iron Mountain Railroad was lifted from the track. **Kansas.**—Topeka: a thunder-storm, attended by high wind and moderate rain and moving from northwest to southeast, occurred between 2.30 and 10.40 a. m.; maximum velocity of wind forty-eight miles per hour. Another thunder-storm occurred during the evening; it was accompanied by unusually heavy rain and high wind, blowing down chimneys, uprooting trees, etc. Half a mile north of this place trees, a foot and upwards in diameter, were snapped off at heights from two to five feet above ground. Much damage was done at McFarland and other towns west of here.

5-6th. Kansas.—Leavenworth: the thunder-storm which occurred during the night was very severe; the wind blew in violent gusts of from forty to fifty-five miles per hour; much damage was done to houses, trees, telegraph and telephone wires; crops, especially corn, suffered seriously. The loss is estimated at from \$30,000 to \$40,000.

6th. Kansas.—Guelph, Sumner Co.: about 7 p. m. a tornado passed within three miles of this place, moving first northeastward and afterwards changing direction to the southeast. Two miles east of this place hail fell which was reported to have measured three inches in diameter. Fredonia, Wilson Co.: this section was visited during the night by a very severe storm, accompanied in some places by hail. The most serious damage was done in this immediate vicinity, where several buildings were damaged. Wellington, Sumner Co.: a destructive storm occurred about 7 p. m. two and a half miles west of Rome, in this county; several buildings were destroyed, entailing damage estimated at from \$7,000 to \$8,000. Fall River, Greenwood Co.: a tornado, moving from northwest to southeast, occurred about 9.20 p. m., destroying barns and other dwellings; damage about \$4,000. Augusta, Butler Co.: a tornado destroyed several barns and other out-buildings in this vicinity during the evening. **Missouri.**—Marshall, Saline Co.: a destructive hail-storm visited this county during the evening. It is estimated that the damage done to buildings and crops will reach \$400,000. Nevada, Vernon Co.: the northern part of this county was visited by a very destructive hail-storm during the night. Its path was about three miles wide, within which all crops were beaten down. Carrollton, Carroll Co.: a destructive storm prevailed at this place during the night; a large amount of damage was done to buildings and crops. Reports show that very destructive storms occurred at various points in western Missouri on this date.

8th. Maryland.—Baltimore: a severe thunder-storm, accompanied by unusually heavy rain and high southwesterly winds, began at 5.40 and ended at 9.25 p. m.; much injury was done by wind and rain; streets and cellars were flooded; several houses were unroofed. **Michigan.**—Marquette: a thunder-storm, accompanied by heavy rain and hail, prevailed from 1.25 to 4.10 p. m.; hail covered the ground to the depth of one and one-half inches. **New York.**—Bethel Corners, Cayuga Co.: a severe hail-storm occurred about 3 p. m., causing serious injury, especially to buckwheat and tobacco; some out-buildings were unroofed. Wolcott, Wayne Co.: a tornado passed through Wayne and Cayuga counties about 4 p. m. It appears to have been most violent in the vicinity of Wayne Centre, where two barns were completely destroyed. The path of the tornado was about forty rods wide. The storm was accompanied by very heavy rain and large hail, the latter causing great damage to orchards and tobacco.

Virginia.—Alexandria: the storm of this date was the most violent that has been experienced here for a long time. It began at 4.30 p. m. and continued about an hour. Some buildings were damaged. Norfolk: two severe thunder-storms, accompanied by heavy rain and high northwesterly winds, passed over this place in the afternoon; lightning, which was incessant, struck several buildings; telegraph lines were prostrated and communication with northern points was interrupted.

10th. Nebraska.—Holland, Lancaster Co.: between 10 and 10.30 p. m. a severe hail-storm passed near this place, destroying all crops in its path, which was about half a mile wide.

11th. Kansas.—Leavenworth: a severe thunder-storm passed over this city in early morning, accompanied by high wind, heavy rain, and small hail; trees and fences were blown down and several houses damaged. A second storm, accompanied by heavy rain and hail, began at 7.20 p. m. and ended during night; many cellars in the business portion of the city were flooded. Damage estimated from \$20,000 to \$30,000. **Missouri.**—Kansas City: a severe thunder-storm, attended by heavy rain and high wind, occurred between 1.05 and 1.55 a. m., during which time 2.14 inches of rain fell, and the wind reached a maximum velocity of forty miles per hour.

12th. Virginia.—Harrisonburg, Rockingham Co.: a violent storm passed over this county from west to east during the evening, doing a large amount of damage to barns, fences, orchards, and crops. The damage is estimated at \$20,000.

13th. Minnesota.—Moorhead: a severe thunder-storm, maximum velocity of wind fifty-four miles per hour from the south, occurred between 10.55 a. m. and 4 p. m.; the farmers in the surrounding country report that large areas of standing wheat were blown down. Reports from points twelve or fifteen miles from station state that the storm was accompanied by hail, which destroyed all vegetation in the track of the storm. **New York.**—Oswego: strong gales, with heavy rain, prevailed on Lake Ontario between midnight and morning. Several vessels were driven ashore and others disabled. In Oswego the gale began at 7.20 a. m. and continued during most of the day. About two inches of rain fell during the night of the 12-13th.

16th. Florida.—Sebastian: high northeast wind prevailed in the afternoon and evening, the wind reaching an estimated velocity of seventy-five miles per hour at 1.30 p. m.; trees and telegraph poles were prostrated, and many small boats were blown ashore; orange groves and other fruit trees sustained damage to the amount of several thousand dollars. **Michigan.**—Oscoda, Iosco Co.: a severe storm occurred here at about 7 a. m., causing a large amount of damage. **New York.**—Orangeport, Niagara Co.: a severe storm, accompanied by hail and lasting from ten to fifteen minutes, occurred between 7 and 8 p. m.; considerable damage was done to orchards and out-buildings. **Quebec.**—Montreal: severe and destructive storms occurred in the surrounding country during the night. Great damage was done by lightning, and a large number of buildings were blown down.

19th. Florida.—Cedar Keys: high wind, maximum velocity forty-two miles per hour, accompanied by light rain, prevailed from 4.18 to 5.50 p. m.; several small yachts were capsized. **South Carolina.**—Lorena, Lexington Co.: the storm on this date was the severest that has occurred here during the past two years. Its path was about one hundred yards in width and its length about three miles. The storm occurred at 5.30 p. m., and was about three minutes in passing this place, during which time rain fell in blinding sheets; the damage was slight and confined mostly to corn and cotton.

19-20th. Mississippi.—Vicksburg: heavy rain and high wind prevailed during the night and continued throughout the day of the 20th; the maximum velocity of the wind ranged from thirty to forty miles per hour. The damage done by the storm in this city, principally by washouts in the streets, was very slight, but it is reported that the injury to the cotton plants was quite serious.

20th. Alabama.—Mobile: light and heavy rain, accompanied by high wind, prevailed throughout the day; the water front in the city was flooded to a depth of three feet. **Florida.**—Pensacola: the wind blew a gale nearly all day; a maximum velocity of sixty miles per hour occurred at 4.20 p. m., causing considerable damage to property. **Michigan.**—Marquette: an unusually severe thunder-storm, accompanied by heavy rain, high wind, and large hail, passed over this city between 2.55 and 3.10 p. m.; the wind, which had a spiral motion, blew at the rate of forty-eight miles per hour, and caused much damage in this city; a large number of shade trees were either broken off or torn up by the roots, and numerous large buildings were unroofed or otherwise damaged; much injury was also done by the heavy rain, by flooding cellars, etc. **Mississippi.**—University: heavy rain and southeast wind prevailed during the entire day; the cotton and corn crops throughout the state were seriously damaged by the storm, and trains were delayed on account of washouts on the railroads. **Tennessee.**—Memphis: rain began at 8.57 a. m. and continued during the day, falling heavily throughout the afternoon, and ended at 11.55 p. m., with high wind from 4.30 to 11 p. m. The streets in some parts of the city were flooded, and Gayso Bayou rose eighteen feet, flooding cellars and houses along its banks and carrying away considerable fencing, etc.; the wells of the artesian water works were partially destroyed; crops, fruit and shade trees, and property in general sustained serious injury. The telephone connections were broken throughout the city and telegraph communication south of here was cut off. The rainfall accompanying this storm was the heaviest that has occurred here for many years. **Virginia.**—Norfolk: nearly 3.25 inches of rain fell during the day; the rainfall was especially heavy from 1.45 to 1.55 p. m., during which time 2.48 inches fell.

20th-21st. Tennessee.—Nashville: heavy rain, accompanied by high wind, began in the evening of the 20th and continued until early morning on the following day, maximum velocity of wind forty-nine miles per hour from the west at 8.55 a. m. The storm caused little damage in and around this city, but was particularly severe from thirteen to thirty miles west of here, where much corn was destroyed and many barns were blown down.

21st. Delaware.—Wilmington: about 6.20 p. m. a tornado caused great damage in this city and vicinity. The course of the storm was in a northeasterly direction, its path being about two hundred yards in width and about five miles in length. More than twenty persons were injured and one was killed. The damage caused by the tornado is variously estimated at from \$100,000 to \$200,000.

NOTE.—The Chief Signal Officer is indebted to Mr. J. Traverse Jones, of Wilmington, Del., for a series of photographs and sketches showing the debris of demolished buildings, prostrated trees, etc., in the path of the above mentioned tornado. The illustrations furnished by Mr. Jones show that this storm was of the most violent class of its character.

Odessa, New Castle Co.: the destructive storm of this date passed about three miles north of this place in a northeasterly direction.

Maryland.—The Signal Service observer at Baltimore reports the following:

The tornado which swept through Prince George's, Anne Arundel, Cecil, and Kent counties appears to have developed in southern Maryland. The first severe damage was done at Jacobsville, Anne Arundel Co., where, between

2.30 and 3 p. m., huge black clouds were observed in the southwest; the clouds moved toward the town and assumed the shape of a funnel and a roaring sound like that of a distant railroad train was heard. The lightning flashed, and a steam-like vapor was visible. The tornado passed through the village, after which it moved to the northeast; its progressive velocity was alternately swift and slow, and it travelled in a zig-zag course. The track varied from thirty feet to a quarter of a mile in width. It moved northeastward across Chesapeake Bay, where water-spouts were formed. About 3 p. m. it struck the village of Still Pond, in Kent county, destroying a cannery and killing eleven persons. About eighteen or twenty persons were injured at other points in the tornado's track. Great destruction was done; houses, fences, trees, and out-buildings were blown down, and crops badly damaged, entailing a loss of many thousands of dollars.

Bowie, Prince George's Co.: a violent local storm, of short duration, occurred here this date. Several buildings were moved from their foundations and whole orchards in the surrounding country were destroyed. The public school building at Bowie was moved fifteen feet. **Woodwardville, Anne Arundel Co.:** about 3.15 p. m. a tornado passed through this section, destroying buildings, etc. **Gambrill's, Anne Arundel Co.:** a severe storm, moving in a northeasterly direction, occurred between 2 and 3 p. m., causing some damage to orchards; it was of about ten minutes' duration. **Chester-town, Kent Co.:** a violent whirlwind passed through a section of this county in the afternoon. It appears to have been most severe in the vicinity of Still Pond, where several buildings were destroyed; among them a cannery, in which about forty persons were employed; of that number eleven were killed and several more or less seriously injured. **New Jersey.**—Salem, Salem Co.: during the afternoon the Salem Brick Works were nearly destroyed, and many other buildings were damaged. **North Carolina.**—Greensborough, Guilford Co.: an unusually violent storm prevailed nearly all day, causing great damage to orchards and crops. **Wilmington:** the high wind which prevailed from 2.03 until 9.28 p. m. caused considerable damage to crops and shade trees. **Pennsylvania.**—Philadelphia: light and heavy rain fell at intervals from 7.05 a. m. until midnight, during which time 2.00 inches of water fell; the rain caused considerable damage in various sections of the city.

27th. Massachusetts.—New Bedford, Bristol Co.: the hail-storm on the afternoon of this date was the severest that has occurred at New Bedford for a number of years. Much damage was done by lightning.

WATER-SPOUTS.

Key West, Fla.: Several large water-spouts were observed four or five miles from shore on the 19th.

The "Baltimore Sun" of the 22d says:

Four water-spouts burst over Chesapeake Bay yesterday. The remarkable meteorological phenomenon was accompanied by tall columns of black clouds moving in rapid rotation, the bay at their bases being violently agitated and heaped up with a leaping or boiling motion, and the water being apparently carried up in large quantities. The funnel-shaped clouds seemed to descend near the mouth of the Patuxent River and pass up the bay over Poole's Island and Whorton's Point, following Elk River over Chesapeake City, and thence into Delaware. Several small vessels were capsized. On shore the wind overturned buildings, levelled fences, and picked up horses and vehicles and carried them hundreds of yards. Damages are reported from different parts of the state. Baltimore City was visited by a rain storm, in which the wind reached the velocity of twenty-two miles an hour, but did no damage.

Mr J. M. Wheatley, postmaster, Edesville, Kent Co., Md., reports that during the severe storm on the afternoon of the 21st several farmers in that vicinity observed water-spouts over Chesapeake Bay.

INLAND NAVIGATION.

FLOODS.

Greensborough, Guilford Co., N. C.: the heavy rainfall during the night of the 9th and on the 10th caused streams in this vicinity to rise to heights greater than have been known for many years. Nearly all of the country bridges were washed away; railroads were badly washed, and dams gave way.

Mobile, Ala.: on the morning of the 20th the high water in

the river covered the wharves and adjacent portions of the city; many stores were flooded, and some wharves and bath-houses were washed away. This flood was due in part to a gale which drove back the water from the bay.

New Orleans, La.: the whole city was inundated on the 20th, nearly ten inches of rain having fallen on that date. About one hundred coal barges on the river were sunk, caus-

ing a loss of about \$250,000. The damage to sugar-cane, cotton, and rice was estimated at about 25 per cent. of the total crop in the southern and eastern portions of the state.

Altoona, Blair Co., Pa.: the heavy rains of the 20th and 21st caused unprecedented freshets in the streams in this vicinity; all country roads leading to this city and Hollidaysburg were rendered impassable.

Washington, Washington Co., Pa.: great damage was sustained by the railroads from the very heavy rainfalls of the 20th and 21st; many bridges, and in some places the road bed, were washed away.

Wheeling, West Va., 21st: a destructive freshet occurred here on this date, many bridges in the surrounding country were washed away. At 6 p. m. the large stone bridge over Wheeling Creek gave way. This bridge was constructed in 1842 and was considered one of the landmarks of the city. At Elm Grove, about five miles from Wheeling, nearly all the buildings were flooded, the damage being estimated at \$25,000.

Reading, Pa.: all streams in this (Berks) county were greatly swollen by the heavy rains of the 21st; the lowlands were inundated and several bridges were washed away.

Uniontown, Fayette Co., Pa.: the very heavy rains during the night of the 20th and 21st and following day flooded the lower portions of the town; south of this place farms were flooded, and bridges washed away.

Bellaire, Belmont Co., Ohio: crops on lands adjacent to streams were ruined by the freshet of the 21st, and much fencing was washed away; washouts occurred along all the railroads in this vicinity.

New Haven, Conn.: the heavy rainfall of the 21st flooded the streets and caused damage to goods stored in cellars, etc.

Pittsburg, Pa.: the heavy rains of the 21st submerged the lowlands in this vicinity; numerous bridges, and in some instances out-buildings, were washed away. The Ohio River rose very rapidly on the 22d, reaching the highest stage, twenty-six feet, that has occurred since February 6, 1884. The river rose about eighteen feet in twenty-four hours.

Hot Springs, Garland Co., Ark.: during the night of the 30th and 31st rain fell in torrents from 11 p. m. to 1 a. m.,

flooding the town. In several large hotels the water reached a depth of four feet; many buildings were totally wrecked.

HIGH TIDE.

Cedar Keys, Fla., 19th.

LOW TIDE.

Southport, N. C. 14th.

In the following table are shown the danger-points at the various stations, the highest and lowest depths for August, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, August, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	1	14.0	27	3.0	11.0
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	31	11.7	15	1.2	10.5
Little Rock, Ark.	23.0	31	4.8	22	2.4	2.4
<i>Missouri River:</i>						
Omaha, Nebr.	18.0	7, 8, 10	10.3	29, 30	8.2	2.1
Leavenworth, Kans.	20.0	12	12.4	20, 29	10.7	1.7
Kansas City, Mo. ....	.....	12	14.7	31	9.6	5.1
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	5	5.7	31	3.0	2.7
La Crosse, Wis.	24.0	14, 15, 16	7.6	31	4.8	2.8
Dubuque, Iowa	16.0	20, 21	7.7	31	5.3	2.4
Davenport, Iowa	15.0	22	5.7	7, 31	4.0	2.7
Keokuk, Iowa	14.0	19	6.4	8, 9	4.0	2.4
Saint Louis, Mo.	32.0	15	19.4	6	12.9	6.5
Cairo, Ill.	40.0	31	24.1	8	12.7	11.4
Memphis, Tenn.	34.0	31	18.2	10, 11	10.6	7.6
Vicksburg, Miss.	41.0	1	24.1	19	12.0	12.1
New Orleans, La.	13.0	1	7.8	25, 26	4.0	3.8
<i>Ohio River:</i>						
Pittsburg, Pa.	22.0	22	26.0	31	2.3	23.7
Cincinnati, Ohio	50.0	26	32.0	7, 10	5.5	20.5
Louisville, Ky.	25.0	28	12.3	10, 11, 12, 16, 17	3.9	8.4
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	26	12.6	17	0.9	11.5
<i>Tennessee River:</i>						
Chattanooga, Tenn.	33.0	24	6.2	1, 19, 20	2.0	4.2
<i>Monongahela River:</i>						
Pittsburg, Penn.	29.0	22	26.0	31	2.3	23.7
<i>Savannah River:</i>						
Augusta, Ga.	32.0	23	13.1	19, 20	5.9	7.2
<i>Willamette River:</i>						
Portland, Oregon ....	.....	1, 2	6.8	30, 31	4.0	2.8

*For fourteen days.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Only a few displays were noted during the month, the most noteworthy of which was that of the 3d, which was seen only in the Lake region and the Northwest. The following notes relate to the aurora above referred to:

Saint Paul, Minn., 3d: an auroral display was observed between 10.15 and 10.50 p. m.; it consisted of six brilliant streamers of yellowish light, which covered 25° of the horizon and rose to altitude 70°.

Marquette, Mich., 3d: a pale white auroral arch, with several bright streamers, covering about 65° of the northern horizon, was observed from 9.35 to 10.50 p. m.

Alpena, Mich., 3d: a few faint auroral streamers, having an apparent motion from west to east, were observed at 8.30 p. m.; the display was obscured by clouds at 10 p. m.

The observer at Saint Vincent, Minn., reports:

A diffuse auroral light, low in the horizon, was observed at 10.10 p. m.; 15th; at 10.40 it had developed into an arch which covered 130° of the horizon and reached an altitude of 55°; at 11 p. m. the aurora waned, but revived again, and its maximum brilliancy occurred at midnight, at which time the display consisted of two bright arches and active "merry dancers," the upper arch having the same dimensions as the first one observed. The display ended during the night.

At Spokane Falls, Wash., a very brilliant and well-defined auroral arch of whitish color was first observed at 3 a. m., 16th; the arch covered 20° of the horizon and rose to altitude 35°; it began to fade at 6.30, and had disappeared at 8 a. m.

Auroras were observed during the month as follows: 2d, Bar Harbor and Orono, Me.; Embarras, Wis. 3d, Bismarck, Kimball, Medford, Pine River, and Webster, Dak.; Cresco and Maquoketa, Iowa; Alpena, Marquette, and Thornville, Mich.; Saint Paul, Minn.; Deuster, Wis. 5th, Dubuque, Iowa. 11th, Davenport and Webster, Dak.; Saint Vincent, Minn.; Fort Maginnis, Mont.; Deuster, Wis. 12th, Moorhead, Minn. 13th, Deuster, Wis. 14th, Eden Centre, N. Y. 15th, Saint Vincent, Minn. 16th, Webster, Dak.; Moorhead and Saint Vincent, Minn.; Fort Maginnis, Mont.; Spokane Falls, Wash. 17th, Moorhead and Saint Vincent, Minn.; Green Bay, Wis. 18th, Benton Harbor, Mich. 26th, Embarras, Wis. 30th, Keokuk, Iowa. 31st, Grand Forks, Dak.; Pekin, Ill.

THUNDER-STORMS.

It will be seen from the accompanying table that thunderstorms were reported from the largest number (thirty-four) of states and territories on the 4th, and nearly as many (thirty) occurred on the 1st and 16th. They were least extensively reported on the 23d and 24th, on which dates they occurred on the former in nine and the latter date in seven states and territories. In Florida, Georgia, Illinois, Kansas, Louisiana, Michigan, Missouri, Tennessee, and Texas thunderstorms occurred on from twenty-two to twenty-eight days during the month; Illinois and Kansas reporting the maximum number of dates. They occurred on five days, or less, in California, Connecticut, the District of Columbia, Idaho, Maine, Nevada,

Oregon, Rhode Island, Utah, and Washington Territory. There was no state or territory from which thunder-storms were not reported, except Delaware, there being no stations of observation in that state.

Table showing the number of stations in the several states and territories reporting thunder-storms for each day during August, 1888.

State or Territory.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	Total No. of days.
Alabama.....			2	3	3	1	1		1	3	1	2			1	1	17	18		1	3	2							2	3	1	19
Arizona.....	1	2								3	2		3	2	6	4					2	4	1	3	4	2	2	2	3	3	4	19
Arkansas.....	1	1	1	1				1		1	1		1															1	1	1	1	15
California.....	1																												3	1		3
Colorado.....	3		1	4		2				2	3	3	3	3	3	1	3	2	1	2		2	1					3	3	1	1	20
Connecticut.....			1	5													4															3
Dakota.....	6	4		10	6	1		1		3		1	5	5					3		2						1	1	1			16
District of Columbia.....								1	1										1													5
Florida.....	2	4	3	4	6	6	4	4	4	4	4	4	3	1	2				3	3		3	2	3	4	1	2		2	2	1	27
Georgia.....	2	2	4	3	3	1	3	4	4	2	3	4	2						2	1	1	1	1	1				2	3	1	2	23
Idaho.....	2																															1
Illinois.....	10	9	19	10	9	21	31	4	1	1	6	8	1	6	10	11	8	1	2	5	15	1			8	6	9	1		3	6	28
Indiana.....	3	4	3	7		3	4	3	1		1	4							4	5	3				1	2	7	3				18
Indiana Territory.....	3	1	1	1			2	2	1										1	1	2						2	1	1			12
Iowa.....	8	6	10	5	13	17	10	1	3	15	7	3	3	25	26	7	1	6	1	5	10				2		1			3	3	25
Kansas.....	4	13	7	9	5	12	1	1	3	5	3	1	4	3	5	1	2	9	3	1			1		3	5	8	6	2	5	1	24
Kentucky.....	2	1	1	3		1	1										1	2							1	2	1					15
Louisiana.....	3	1	4	2	2		1	6	3	5	4	2		1	2	4	2	3	5	4	2	3	1	4	1		1	4	4	4	3	28
Maine.....																										5	2	3				4
Maryland.....	1			1	3			4					3				2															7
Massachusetts.....		1	1	4		1											6				3	2					5					8
Michigan.....	1	15	11	6		4	4	1		2	1			4	4	13	1				1	4		1	1		1	3	3		9	22
Minnesota.....	3	8		7	7			1	1	1				1	3	1	2	1		3												13
Mississippi.....			2	1						1	1								1										1	2	2	10
Missouri.....	2		5	4	5	5	5	1									1	1	1	4	1				3	1	2	2	1	2	2	22
Montana.....	1	4	3	2	1			1	1				1	1					1	1						2						12
Nebraska.....		6	6	7	9	4			1	7	3	1		6	8	1			1	3	5	2										18
Nevada.....																																3
New Hampshire.....							1	1								1	1		1							1	2	2				8
New Jersey.....	2			4	3			5		1	6					3	3	1			4						1	4				12
New Mexico.....	2									2	1				1	2	2	1	3	3	4			2	2			1	2	1		17
New York.....			3	12		3	8									7	5				2	1				4	3					13
North Carolina.....		2					1	1	4	5	3	2	1	4				1	3		1	1										14
Ohio.....	5	3	12	11	1		13	1	1		3	16		6	1	9	3	1		3	2					1	2					21
Oregon.....	1																															5
Pennsylvania.....	2		5	17	8	1	1	12	2		1	21	13	7	1							3				1	9	1				18
Rhode Island.....																																1
South Carolina.....		6	8	4	3		3	7	12	8	1	2	2					2	5	2	4	2						1	2	6	8	20
Tennessee.....	1	3	12	8	1	1	3	7	3	1	4	3		1	1	4	6	10	5	3	3	1					2	4	2	4	10	26
Texas.....	4	4	2				3	4	6	1	2	4	5		2	2	3	5	9	3	1	1	4	6	4	3	4	5	4	7	3	27
Utah.....	1																															4
Vermont.....	1			1			1	3	1		1				1	1	3	2	1													18
Virginia.....	5	1	2	1	5	1	2	6	4		1	5					2	3	5	4	2	1										18
Washington.....	2	1																														2
West Virginia.....			1	2	1		1	1				3				1	1															9
Wisconsin.....		6	5	2	1	1								5	4	7		1	1													12
Wyoming.....	6	2		1		2	1	1				1	3	1	4	2	1															15
Number of States reporting.....	30	26	29	34	22	21	23	29	22	17	26	28	18	19	21	30	23	25	21	19	23	17	9	7	13	19	24	18	20	23	23	

MISCELLANEOUS PHENOMENA.

DROUGHT.

Lynchburg, Va., 9th: reports from Appomattox county state that while some sections of that county have had partial rains there are other portions where the rain during the past two months has not been sufficient to wet the ground, and corn and tobacco are suffering in consequence.

Palestine, Tex., 9th: the severe drought which caused some damage to crops, especially to cotton, was broken on this date.

Oak Grove, Christian Co., Ky., 10th: corn and tobacco in this section have suffered much injury from the dry weather.

Nashville, Tenn.: the rain, 1.56 inches, which fell between the 16th and 18th broke the drought, which has been very severe for the past two weeks.

Winnemucca, Nev., 21st: stock men report a great scarcity of water on the ranges, and that the stock is suffering in consequence; the springs in the mountains are drying up.

Sebastian, Fla., 23d: on account of the continued dry weather the oranges in this section are falling from the trees.

Petersburg, Va., 31st: the drought in the southern counties of Virginia has become very serious; in some sections there has been very little rain for several months, and the crops are scorched; all creeks and small streams are drying up.

Pueblo, N. Mex., 31st: owing to the dry weather stock men in this and adjoining counties have moved their cattle to Kansas; little or no hay has been cut, except where water for irrigation was to be had, and in some sections entire crops were lost on account of insufficient water supply.

Birmingham, Oakland Co., Mich., 31st: the drought during the month has been most severe; in many places the farmers

are unable to plow their land, the dry soil reaching the depth of four feet below the surface.

Thornville, Lapeer Co., Mich.: the month has been very dry, corn has been greatly injured, and pastures are almost all killed by drought.

FOREST AND PRAIRIE FIRES.

Los Angeles, Cal.: extensive fires prevailed about Anaheim, in the Upper Santa Anna Valley, and below Norwalk, Los Angeles Co., on the 13th. Smoke from large mountain fires was observed over the Sierra Madre range northeast of this city on the 22d and 23d.

Ishpeming, Marquette Co., Mich.: forest fires burned on all sides of this village and extended on both sides of the railroad for many miles on the 27th. Several buildings were burned.

Helena, Mont.: on the 31st a disastrous prairie fire raged on the ranges in northern Montana, extending from Maria River to the Sweet Grass Hills, a distance of fifty miles; the winter range of the Fenton and Saint Louis Cattle Company was destroyed with a large amount of hay.

Forest and prairie fires occurred also as follows: Fort Sill, Ind. T., 1st to 7th; Fort Reno, Ind. T., 3d to 7th, 14th; Red Bluff, Cal., 11th to 20th, 23d to 28th; San Diego, Cal., 25th.

HALOS.

The dates on which solar halos were observed over the greatest extent of territory during August were the 7th, 14th, 16th, 20th, 27th, and 31st; they were least numerous on the 1st, 2d, 4th to 6th, 7th to 9th, 13th, 22d to 25th, 28th, and 30th. They were observed on from eight to twenty dates in Illinois,

Mississippi, Ohio, and Tennessee; Illinois reporting the maximum. In the remaining states they were either not observed at all or on very few dates.

But few lunar halos were reported from the 1st to 13th, there being seven days during that period on which none were reported; from the 14th to 20th they were observed in from five to fifteen states and territories, and during the balance of the month they were of rare occurrence. They were seen on from five to twelve days in Alabama, Connecticut, Illinois, Missouri, New Jersey, New York, Pennsylvania, Tennessee, and Virginia; in the remaining states and territories they were either not observed at all or on a small number of dates.

The phases of the moon, Washington mean time, during August, as given in "The American Ephemeris and Nautical Almanac," are as follows: new moon, 7th, 1h. 12.7m.; first quarter, 13th, 23h. 35.8m.; full moon, 20th, 23h. 12.1m.; last quarter, 28th, 21h. 9.7m.; apogee, 13th, 18.9h.; perigee, 27th, 19.6h.

METEORS.

Sebastian, Fla.: a meteor, apparently one-half the size of the full moon, was observed in the east at 6.50 p. m., 12th; it moved in a westerly direction, and when about 10° from the horizon it exploded with a loud report like that of a cannon; the meteor left a long trail in its path which lasted about thirty seconds. It is reported that the same meteor was seen and heard to explode about ten miles from this place.

The following is taken from "Science" of September 14th:

Mr. A. B. Knight, of Butte City, Montana, reports that on the evening of August 19th a brilliant meteor was observed from that city, and the following is the results of observations made by Mr. J. C. Mayo: "At 6.35 p. m. (local time) a meteor burst into view in the southern heavens, and moved in an apparent downward and northeasterly direction. About two seconds (estimated) after its appearance the meteor burst, first into two parts, and then into fragments, which disappeared. At the expiration of five minutes and thirty seconds two loud reports, nearly simultaneous, were heard. These reports were like the explosion of heavy blasts of powder, and were followed by a rumbling, like near thunder, lasting about ten seconds. The place in the sky where the meteor was first seen was S. 60° E. from the Blue Bird Mine, at an elevation of 50° from the horizon. The place where it burst was due east and at an elevation of 25°. The meteor was a well defined body, egg-shaped, with the smaller end foremost. This body was distinctly visible, 'resembling white-hot iron', giving off a pure white light, and was followed by a 'bright blaze', which shaded into a dense white, 'sulphurous' smoke. The trail of smoke left behind remained visible for fully ten minutes. The sky was clear and the sun shining brightly, but the meteor apparently emitted as much light as the sun, and lighted up its shadows."

The meteor above referred to was also observed at Deer Lodge, Boulder, Helena, and Virginia City, Mont.

Fort Maginnis, Mont.: a brilliant meteor was observed, moving from a point a little east of north in a westerly direction, at 9 p. m., 19th; the meteor, when passing, lit up the surrounding objects.

Brock's, Emery Co., Utah: a brilliant meteor was observed in the northeast at an altitude of 60°, moving in an easterly direction, at 7.22 p. m., 21st, and disappearing when about 2° above the horizon; the meteor left a reddish train of light, which lasted about one and three-quarter seconds. Twelve meteors were observed from evening twilight until 11.30 p. m., 22d, moving from the zenith to the horizon in the eastern and northern sky; each emitted a bright light like the electric light, and lasted from one-half to three-quarters of a second.

Salina, Saline Co., Kans.: a brilliant meteor, of fiery red color, was observed, moving from southeast to northwest, at 9 p. m., 29th; during its flight the sky was lighted up as if by bright moonlight for fully fifteen seconds. This meteor was also seen at Manhattan and other points in Kansas.

Meteors were also observed as follows: 1st, Auburn, Ala.; Dudley, Mass.; Kalamazoo, Mich. 2d, Kalamazoo, Mich.; Fort Stanton, N. Mex.; Cleburne and Mesquite, Tex. 3d, Manatee, Fla.; Kalamazoo, Mich.; Collinwood, Ohio; Cleburne and Mesquite, Tex. 4th, Yuma, Ariz.; Pekin, Ill.; Kalamazoo, Mich.; Cleburne and Mesquite, Tex. 5th, Yuma, Ariz.; Webster, Dak.; Archer, Fla.; Boise City, Idaho; Kalamazoo, Mich.; Cleburne and Mesquite, Tex.; Marion, Va. 6th, Keeler, Cal.; Manatee, Fla.; Kalamazoo, Mich.; Utica, N. Y.; Quakertown, Pa.; Cleburne and Mesquite, Tex.; Marion, Va. 7th, Fort Stanton, N. Mex.; East Portland, Oregon; Quakertown, Pa.; Stateburg, S. C.; Cleburne and Mesquite, Tex.; Lynchburg and Marion, Va. 8th, Pekin, Ill.; Vevay, Ind.; Garrettsville, Ohio; Mesquite, Tex.; Deuster, Wis. 9th, Auburn, Ala.; Yuma, Ariz.; Duke, Fla.; Cedar Rapids, Iowa; Lexington, Ky.; Dudley, Fall River, and Somerset, Mass.; Winnemucca, Nev.; Wauseon, Ohio; Quakertown, Pa.; Austin and Memphis, Tenn.; Brownsville, Tex. 10th, New Market, Ala.; Prescott, Ariz.; Lead Hill, Ark.; Sacramento, Cal.; Webster, Dak.; Cedar Keys, Fla.; Charleston, Ill.; Cedar Rapids, Iowa; Blue Hill Observatory, Dudley, Fall River, and Somerset, Mass.; Kalamazoo, Mich.; Biloxi, Miss.; Winnemucca, Nev.; Beverly, N. J.; Brownsville, Tex.; Lynchburg, Marion, and Rappahannock, Va. 11th, Lead Hill, Ark.; Cedar Rapids, Iowa; Kalamazoo, Mich.; Saint Vincent, Minn.; Moorestown, N. J.; Marion and Rappahannock, Va.; Deuster, Wis. 12th, Keeler, Cal.; Jacksonville, Ill.; Kalamazoo, Mich.; Brownsville, Tex. 13th, Kalamazoo, Mich. 14th, Kalamazoo, Mich.; Wauseon, Ohio; Brownsville and Mesquite, Tex. 15th, Kalamazoo, Mich.; East Portland and McMinnville, Oregon; Quakertown, Pa.; Brownsville and Mesquite, Tex. 17th, Monticello, Iowa. 18th, East Portland, Oregon. 19th, Boise City, Idaho; Virginia City, Mont.; Utica, N. Y. 21st, East Portland, Oregon; Mesquite, Tex. 22d, Jacksonville, Ill.; Vevay, Ind.; Beverly, N. J. 23d, Yuma, Ariz.; Windsor, Ill.; Kalamazoo, Mich.; Brock's, Utah. 24th, Jacksonville, Ill.; Vevay, Ind.; Dudley, Mass.; Kalamazoo, Mich. 25th, Keeler, Cal.; Pekin, Ill.; Kalamazoo, Mich.; Egg Harbor City, N. J. 26th, Woonsocket, Dak.; Dudley, Mass. 27th, Dudley, Mass.; Biloxi, Miss.; Eden Centre, N. Y.; Wauseon, Ohio; Quakertown, Pa. 28th, Keeler, Cal.; Vevay, Ind.; Clarinda, Iowa; Manhattan, Topeka, and Yates Centre, Kans.; Dudley, Mass.; Tecumseh, Nebr. 29th, Glenwood, Iowa; Dudley, Mass.; Beverly, N. J. 30th, Kalamazoo, Mich.; Collinwood, Ohio; Cleburne, Tex.; Deuster, Wis. 31st, Jacksonville, Ill.; Helena, Mont.

MIRAGE.

Kitty Hawk, N. C.: a mirage was observed to the east, north, and south of this place from 9.48 to 11.10 a. m. 22d; vessels eight miles from shore appeared in both natural and inverted positions; life-saving stations thirty miles north of here appeared very near and elevated along the beach; and forests were depicted in the sky in an inverted position.

Mirage was also observed as follows: Davenport, Dak., 9th, 12th, 15th, 19th, 22d; Webster, Dak., 4th, 18th, 19th, 21st to 25th, 28th, 29th, 31st; Hampton, Iowa, 2d, 28th; Moorhead, Minn., 12th, 15th; Marquette, Nebr., 23d, 29th.

SAND STORMS.

Rio Grande City, Tex., 5th to 8th, 19th; Fort Grant, Ariz., 12th, 15th; Fort McDowell, Ariz., 13th, 14th, 24th; Winnemucca, Nev., 16th, 17th.

VERIFICATIONS.

INDICATIONS FOR 36 HOURS IN ADVANCE.

The percentages of verifications of the bi-daily indications for July, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for districts east of the Rocky Mountains for July, 1888, were made by Assistant Professor H. A. Hazen, and those for the Pacific coast were made by 2d Lieutenant Joseph E. Maxfield, Signal Corps; the verifications for all districts were determined by Assistant Professor C. F. Marvin.

Percentages of indications verified, July, 1888.

States.		States.	
Maine.....	67.0	Ohio.....	81.0
New Hampshire.....	70.3	West Virginia.....	78.8
Vermont.....	73.3	Indiana.....	80.9
Massachusetts.....	64.5	Illinois.....	78.2
Rhode Island.....	60.5	Lower Michigan.....	74.7
Connecticut.....	70.4	Upper Michigan.....	75.4
Eastern New York.....	71.0	Wisconsin.....	75.1
Western New York.....	76.6	Minnesota.....	75.2
Eastern Pennsylvania.....	71.2	Iowa.....	75.4
Western Pennsylvania.....	70.8	Kansas.....	75.5
New Jersey.....	70.6	Nebraska.....	74.1
Delaware.....	72.6	Missouri.....	74.4
Maryland.....	70.7	Colorado.....	74.0
District of Columbia.....	76.3	Eastern Dakota.....	72.5
Virginia.....	76.8	Southern California*.....	77.5
North Carolina.....	70.7	Northern California*.....	80.0
South Carolina.....	70.7	Oregon*.....	78.6
Georgia.....	77.7	Washington Territory*.....	77.8
Eastern Florida.....	82.1	By elements:	
Western Florida.....	76.2	Weather.....	82.0
Alabama.....	74.8	Temperature.....	64.7
Mississippi.....	73.0		
Louisiana.....	74.3	Monthly percentage of weather and	
Texas.....	80.5	temperature combined.....	75.1
Arkansas.....	75.4		
Tennessee.....	76.2		
Kentucky.....	78.8		

* From the 1st to the 11th, inclusive, the predictions were made for twenty-four hours, beginning nine hours after the observations on which the predictions were based; during the remainder of the month they were made for thirty-six hours, beginning with the observation on which they were based. In determining the general average percentage for the different elements, the Pacific coast states have not been included.

INDICATIONS FOR 24 HOURS IN ADVANCE.

The percentages of verifications of the bi-daily indications for August, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for all districts for August, 1888, were made by 1st Lieutenant Robert Craig, 4th Artillery, Acting Signal Officer and Assistant, and the verifications of the same were determined by Assistant Professor C. F. Marvin.

Percentages of indications verified, August, 1888.

States.		States.	
Maine.....	72.6	Ohio.....	81.4
New Hampshire.....	73.4	West Virginia.....	80.5
Vermont.....	75.1	Indiana.....	76.5
Massachusetts.....	80.7	Illinois.....	75.4
Rhode Island.....	85.3	Lower Michigan.....	75.1
Connecticut.....	84.3	Upper Michigan.....	79.5
Eastern New York.....	77.5	Wisconsin.....	79.5
Western New York.....	77.2	Minnesota.....	73.0
Eastern Pennsylvania.....	74.5	Iowa.....	74.3
Western Pennsylvania.....	70.4	Kansas.....	76.2
New Jersey.....	84.3	Nebraska.....	79.5
Delaware.....	89.0	Missouri.....	73.1
Maryland.....	85.2	Colorado.....	77.2
District of Columbia.....	81.0	Eastern Dakota.....	77.4
Virginia.....	83.2	Southern California.....	...
North Carolina.....	79.0	Northern California.....	...
South Carolina.....	77.3	Oregon.....	...
Georgia.....	72.5	Washington Territory.....	...
Eastern Florida.....	78.0	By elements:	
Western Florida.....	72.6	Weather.....	82.0
Alabama.....	74.6	Temperature.....	72.2
Mississippi.....	73.7		
Louisiana.....	73.3	Monthly percentage of weather and	
Texas.....	83.3	temperature combined.....	78.1
Arkansas.....	70.6		
Tennessee.....	77.5		
Kentucky.....	78.5		

The following extracts from the official instructions governing the verifications of the predictions of the Signal Service are given:

The monthly percentages of verifications of predictions of weather and temperature for each state and territory will be combined by multiplying the

respective percentages of verifications of predictions of weather by six (6), and of temperature by four (4), and dividing the sum of the respective products by ten (10). The quotient will be the average percentage of verifications of predictions of weather and temperature for the particular state or territory and month in question.

The general monthly percentage of verifications of all indications will be determined by multiplying the general monthly percentage of verifications of weather and temperature combined by five (5); of the display of cautionary and storm signals by two (2); of cold waves by one (1); and dividing the sum of the products by eight (8); except during those months in which not more than three cold-wave signals are ordered, when cold waves will be omitted and the sum of the remaining products will be divided by seven (7). The quotient will be the general monthly percentage of verification of all indications.

CAUTIONARY SIGNALS FOR JULY.

Statement showing percentage of justifications of wind signals for the month of July, 1888: Number of cautionary signals ordered, nineteen; justified, wholly or in part, sixteen. Number of storm signals ordered, two; justified, two. Number of signals ordered for easterly winds, one; justified, one. Number of signals ordered for westerly winds, eighteen; justified, fifteen. Number of storms without signals, twelve. Number signals ordered late, or after the justifying velocity had begun, six. Percentage of justifications, 58.0.

CAUTIONARY SIGNALS FOR AUGUST.

Statement showing percentage of justifications of wind signals for the month of August, 1888: Number of cautionary signals ordered, ten; justified wholly or in part, five. Number of storm signals ordered, sixteen; justified, wholly or in part, fourteen. Number of signals ordered for easterly winds, eighteen; justified, sixteen. Number of signals ordered for westerly winds, eleven; justified, five. Number of storms without signals, thirty-three. Number of signals ordered late, or after the justifying velocity had begun, three. Percentage of justifications, 45.6.

LOCAL VERIFICATIONS.

The following extracts from the published reports of the state weather services for August, 1888, show the percentages of verification of weather and temperature signals:

Indiana.—Crawfordsville: During the month the temperature signals received were verified each day, but the weather signals missed seven times.

Worthington: Twenty-one weather predictions were verified, and five not verified; twenty-four temperature predictions were verified, and two not verified.

Michigan.—Weather signals are now displayed in one hundred and thirty-two towns in the state, and upon the baggage-cars of twenty-six trains of eight of the principal railroads of the state.

The indications are issued at 10 p. m., daily, from the Chief Signal Office, Washington, and are for the twenty-four hours from 7 a. m. to 7 a. m.

The percentage of verification of these indications for August is as follows (the verification is taken from reports of displaymen furnished this office monthly): temperature, 77.7 per cent; weather, 70.3 per cent; temperature and weather, 74.0 per cent.

Weather signals are displayed on the baggage cars of the following railroads: C. & G. T. R'y; D., G. H., & M. R'y; D. D. G. T. R'y; M. C., main line and branches; C. & W. M. R'y; G. R. & I. R'y; P. H. & N. W. R'y; and the P. O. & P. A. R'y.

Minnesota.—The verification of weather signals were: 77 per cent. for weather, and 80 per cent. for temperature.

Nebraska.—The percentages of correct weather predictions for the state were: temperature, 89.6; weather, 88.1; mean, 88.8.

South Carolina.—The percentage of verification of the weather and temperature predictions for the state was: weather, 70.0; temperature, 83.0.

Tennessee.—The percentage of verification of weather and temperature predictions for the month at the following stations were: Jonesborough, weather, 96.3; temperature, 96.3. Clarksville, weather, 63.0; temperature, 88.8. Mason, weather, 96.3; temperature, 96.3.

STATE WEATHER SERVICES.

The following extracts are republished from reports for August, 1888, of the directors of the various state weather services:

ALABAMA.

The month opened with the rainfall about an average and the crops greatly benefited by the favorable season, but towards the close the rains were almost continuous, and during this period farming interests were greatly damaged. This condition of the weather was evidently produced by the range of atmospheric pressure over the United States during the month. On the 7th low

pressure occurred in northwestern Texas and high in the northeastern and northwestern portions of the United States. The result of the struggle between these two opposing forces was rain over the Gulf States from the 4th to the 8th. On the 18th, 19th, and 20th low barometer was recorded in the Gulf States and high off the Atlantic and in the Northern States. On the 20th the low pressure began to move northeastward, and heavy rains were produced in Alabama. From the 21st to the 29th low pressure was forced

to the northeast and northwest and high pressure was indicated in Tennessee and the Middle States. This condition produced fair weather, with a small precipitation in Alabama. From the 29th until the close of the month the extreme low barometer on the Gulf produced strong winds along the borders of the Gulf and easterly winds, with rains, over Alabama. These rains were still falling at the close of the month, with tornadic tendencies on the coast and in middle Alabama. The total rainfall for August was 2.01 inches above the normal.

The temperature during the first week was high and quite oppressive in some localities, but the month ended with pleasant nights and the heat of the days very much moderated. The average temperature was 2° below normal.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 78.8; highest monthly mean, 82.4, at Selma; lowest monthly mean, 71.5, at Tuscaloosa; maximum, 98, at Marion and Fort Deposit, on the 2d and 3d; minimum, 52, at Fort Deposit, on the 25th; range for the state, 46; greatest local monthly range, 42, at Fort Deposit; least local monthly range, 23, at Bermuda and Troy.

Precipitation (in inches).—Average for the state, 7.25; greatest, 14.35, at Mobile; least, 1.91, at Pine Apple.

Wind.—Prevailing direction, southeast.—*P. H. Mell, jr., Signal Corps, Auburn, director.*

ILLINOIS.

August has been an unusual month in many respects. Its temperature has been below the average of the last ten years, and its rainfall very irregular—in some instances far above the average, and in others far below. The mean temperature of the state was 2° below the average of the last ten years, distributed as follows: northern division, 1° 6; central, 2° 2, and the southern, 2° 5. The first four days were extremely hot—the 2d being the hottest—but during all the rest of the month the weather was cooler than usual.

The following are the departures from the mean at a few of the stations where the records cover a number of years: at Peoria it was 2° 4 below the mean of thirty-two years; at Marengo, 2° 5 below the mean of twenty-seven years; at Chicago, 2° 2 below the mean of seventeen years; at Springfield, 4° 2 below the mean of nine years; at Oswego, 1° 6 below the mean of eight years; at Saint Louis, 3° 8 below the mean of seventeen years, and at Cairo, 3° 2 below the mean of seventeen years. It will thus be seen that this great depression of temperature below the mean prevailed all over the state, and has added to the already large deficiency of the previous months. At Chicago it is 73° 1; at Springfield, 87° 8; at Saint Louis, 47° 6, and at Cairo, 47° 0. To the northward and westward this deficiency increased rapidly. At Marquette, Mich., it was 129° 3; at Saint Paul, 135° 4; at La Crosse, 141° 5; at Davenport, Iowa, 104° 7, and at Keokuk, 90° 9.

The monthly rainfall was below the average of ten years in both northern and central divisions, but in the southern it was far above, so that the total average for the month, 4.09 inches, was 0.80 inch above the average. It was mostly in the form of showers, some of which were extremely heavy, but seldom very extensive in range. In many instances torrents poured down in one county, while in an adjoining one but little fell. There were a few heavy showers in the northern and central divisions of the state, but by far the greater number occurred in the southern division. At Marengo 2.50 inches fell on the 16th in a little over five hours; 2.80 inches fell at Sycamore on the same day; 3.00 inches at Joliet, and 2.10 inches at Oneida on the 15th; 2.00 inches at Pana and White Hall on the 6th. At Jordan's Grove, Randolph Co., 3.55 inches fell on the 20th between 3 and 9 p. m. At the same place 1.20 inches fell in thirty-five minutes on the morning of the 4th. At Irish-town, Clinton Co., 2.42 inches fell on the 18th; at Saint Louis, 2.46 inches on the 26th; at Richview, 2.34 inches on the 6th, and at McLeansborough, 2.09 inches on the 4th. Rainfalls of over an inch were numerous.

Several light frosts occurred in the northern part of the state, but no damage was reported.—*Col. Charles F. Mills, Springfield, director; James Cassidy, Sergeant, Signal Corps, assistant.*

INDIANA.

The temperature during the month after the 4th was cool throughout, and the monthly mean much below the normal. The means from the 1st to the 4th and from the 15th to the 17th alone were above the normal. Maximum temperatures above 90° occurred from the 1st to the 3d; the highest occurred nearly everywhere on the 3d, and the lowest was noted on the 23d, when the high barometric area approached the state. The change in temperature was only gradual; abrupt changes from a higher to a lower were only noted on the 9th, 12th, and 20th, and from a lower to a higher on the 13th and 24th. Light hoar frost was reported from a few places on the 23d.

Rainy days were quite frequent, but the amount was badly distributed. In the southern portions the total amount was large and much above the average precipitation for August, while in the northern portions only small amounts, much below the average, were measured. The total monthly measurements throughout the state ranged from 0.30 to 11.59 inches. Dew occurred very frequent during the first half of the month, less so during the latter. Thunderstorms, especially in the southern portions, occurred on many dates, but a few only were accompanied by strong, destructive winds, notably those on the 7th, which caused some damage at several places.—*Prof. H. A. Huston, Lafayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA.

The mean temperature of the air was 1° below normal. The middle decade was cold, averaging 3° below normal. The first four days of the month were

hot, cases of sunstroke occurring on the 1st and 2d; the seven days from the 8th to the 14th were decidedly cool, averaging nearly 10° below normal. No frost occurred during the month, except in the northeastern portion of the state where a light hoar frost was reported.

The first half of the month was generally rainy or showery, local rains occurring on each and every day in some part of the state until the 16th; the last half was fine and dry, very favorable to the ripening of corn and for farm work and fairs, hardly any rain falling during that time. The total rainfall averaged about normal for the state, though it was quite unevenly distributed. The lowest amount, 2.00 inches, is reported from Waterloo; the highest, 8.50 inches, at Corning, Adams Co. Nearly the entire south and west received from 4.00 inches upwards, while the northeast averaged about 2.50 inches.—*Gustavus Hinrichs, Iowa City, director.*

KANSAS.

The temperature has ranged below the normal over the entire state, the greatest deficiency occurring in the central-eastern counties. In Leavenworth and Wyandotte it is 4°. South and west this diminishes, being but 1° 8 in Montgomery and 1° 7 in Ford.

The average precipitation for the state is 4.39 inches. In the eastern division it is 5.69 inches; in the middle, 3.96 inches; and in the western, 3.51 inches. The largest monthly rainfall is 10.00 inches and occurred in Haskell county. Wyandotte very nearly equals it, while Leavenworth comes next with 9.23 inches. Johnson and Douglas in the east and Grant in the west are next in order, while the contiguous portions of Lyon, Chase, Butler, and Greenwood also received 9.00 inches. The belt of heavy rainfall lies in a direction from southwest to northeast, from Pratt and Barber to Leavenworth and Johnson, with another area covering the extreme southwestern counties. The line of minimum rainfall extends from Stafford to Trego and Gove, and occurs again in Decatur and Rawlins. The heavy rainfalls are certainly unusual for August. It is the largest August rainfall on Professor Snow's twenty-year record, or on the Signal Service's eighteen-year record at Leavenworth, and has been exceeded but twice on the fifty-year record at Fort Leavenworth, viz., 1855 it was 10.18 inches and in 1865 it was 9.66 inches. In August, 1876, the State Agricultural College at Manhattan received 10.70 inches and Fort Riley 12.86 inches, while in 1880 Fort Riley received 10.20 inches and Washburn College 9.11 inches. In 1870 Atchison measured 13.10 inches for August and Holton 11.25 inches. In August, 1868, at Council Grove 15.35 inches fell and at Olathe 14.40 inches, while for August, 1865, Olathe measured 13.10 inches. At Paola, in August, 1869, they had 9.75 inches, and in August, 1870, 9.78 inches.

The close of the month finds the corn crop so far advanced as to be practically independent of any further meteorological influences, a large part of it being already cut and in the shock, while new corn is already on the market to no inconsiderable extent.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 76; highest monthly mean, 82, at Dorrance; lowest monthly mean, 69, at Goodland; maximum, 113, at Brookville on 14th; minimum, 42, at Ellsworth, on the 26th and 28th; range for state, 71; greatest local monthly range, 62, at Ellsworth; least local monthly range, 41, at Sedan; greatest daily range, 40, at Goodland, on the 13th; least daily range, 2, on the 17th, at Coldwater.

Precipitation (in inches).—Average for the state, 4.39; greatest, 10.00, at Santa Fe; least, 1.04, at Gibson.

Wind.—Prevailing direction, southeast.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

LOUISIANA.

The month of August, 1888, will be long remembered in the meteorological history of southern and eastern Louisiana for its excessive rainfall and high wind, the greatest on record for the past fifty years. The latter part of the month, from the 14th to the close, was particularly destructive in the eastern part of the state: the heavy rains and high winds of the 15th damaged the cane and cotton, only to be followed by the hurricane of the 19th and 20th, to add to the general devastation, since which date, the daily excessive rainfalls have added to the injury, so that at the present time there is probably 25 per cent. of the crops of the state ruined. The western section of the state escaped these disasters, and reports from that section show that the meteorological conditions of the month had a beneficial effect on vegetation.

Summary.

Temperature (in degrees Fahr.).—The average temperature for the month of August, 1888, 80.8, was 0.9 below the normal for the state for that month of past seventeen years, the greatest local departures from the monthly means occurring in the extreme northern and southern sections. The highest temperature recorded during the month was 102.5, at Liberty Hill, on the 7th, and the lowest, 65, at the North Louisiana Experimental station and Baton Rouge. The prevailing dates of the occurrence of the highest temperatures were the 1st and 2d, and of the lowest, from 23d to 27th.

Precipitation (in inches).—The average rainfall for the past month was 10.84, which was 6.69 above the normal August rainfall for the state. In the northern section the average fall, 6.85, was 3.78 above the normal for that section; the average for the southern section, 14.83, was 9.15 above the normal for that portion. Excepting in the northwestern part of the state the local rainfalls reported for the month are all greatly in excess of the normals for the various parishes, and in many the amounts are greatly in excess of any monthly rainfall on record. At New Orleans the excess over the normal

amounted to 16.71; at Amite it was 11.99 above; and at Mandeville 10.57 above.
—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

Temperature (in degrees Fahr.).—The mean temperature for August, 66.3, is 2.1 below the normal of thirteen years. The temperature was below the normal in all sections during August, the greatest deficiency occurring in the Upper Peninsula, and the least in the southern section. The mean daily temperature was above the normal on ten days, below on twenty days, and normal one day. The highest mean daily temperature, 77, occurred on the 3d, when the temperature was 7 above the normal, and the lowest, 57, occurred on the 13th and 22d, when the temperature was 12 and 11, respectively, below the normal. The highest mean daily temperature for the past thirteen years, 82, occurred on the 30th, 1881, and the lowest, 53, occurred on the 26th, 1885 and 1887. The highest monthly temperature, 73.2, occurred in 1876, and the lowest, 63.0, occurred in 1885. The maximum temperature, 98, occurred at Bell Branch and Berlin, on the 3d, and the minimum, 28, occurred at Iona, on the 28th.

Precipitation (in inches).—The average amount of precipitation for August, 2.48, is 0.72 below the normal of thirteen years. The precipitation was below the normal in the Upper Peninsula, central and southern sections, and above the normal in the northern section. The greatest deficiency occurred in Cass county, where but 0.10 fell, and is 2.38 below the average for the state. The largest rainfall occurred in Mecosta county, where 7.37 was recorded at Big Rapids, and the next largest, 6.00, at Chase, Lake Co. Of the heavy rainfall at Big Rapids, 4.90 was recorded on the 14th and 15th. A large rainfall is recorded at Detroit on the 4th, the amount in twenty-four hours being 3.90. General rains fell on the 2d, 3d, 4th, 6th, 7th, 11th, 12th, 14th, 15th, and 16th, and local rains on the 21st, 30th, and 31st. Seventeen stations report a fall of 1.00, or more, in twenty-four hours during the month. The drought was general in the central and southern sections from the 18th to the 31st, and in many localities the drought was not broken on that date. The drought was most severe in the southwestern part of the southern section, and the crops have been seriously affected. Comparing the precipitation for August with the records of the past twelve years it is found that the largest monthly rainfall, 6.05, occurred in 1882, and the least, 1.12, occurred in 1883.

The precipitation for August, 1887, was 1.95, or 0.54 below the record for this year. Thunder-storms were reported in the different sections on twenty-three days. The average number of days on which 0.01, or more, of precipitation was recorded in the different sections is as follows: Upper Peninsula, 10.2; northern section, 7.9; central section, 7.9; southern section, 6.8; for the state, 7.8.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

A notable feature of the month of August was the early occurrence of the first frost of the season in the northern part of the state. The first light frost was noted at Saint Vincent and Grand Forks on the 9th, and Moorhead on the 17th. This early frost damaged the wheat and other crops in northern Minnesota and Dakota. First frosts of previous years, in the upper part of the state, are recorded as follows: Saint Vincent, September, 13, 1880; September 6, 1881; September 20, 1882; September 8, 1883; September 20, 1884; August 24, 1885; August 31, 1886 (light); August 18, 1887 (light). Moorhead, September 15, 1881; September 20, 1882; September 8, 1883; October 4, 1884; August 26, 1885; August 31, 1886 (light); August 24, 1887 (light). It will be seen by comparison that frost occurred one week earlier this year than in either of the eight years preceding.

Temperature (in degrees Fahr.).—The temperature for the past month was in general a little more than 3 below the August normal for the state, which is about 66.5. The deficiency was 4.7 at La Crosse, 3.5 at Saint Paul, 3.2 at Saint Vincent, 2.3 at Duluth and Moorhead, and 1.2 at Minneapolis. The highest temperature, 98, was reported at Grand Meadow, on the 2d, and the same at Spring Valley, on the 3d; the lowest, 30.4, was at Saint Vincent, on the 17th; range for the state, 67.6.

Precipitation (in inches).—The rainfall was in excess in the southwestern part of the state, also in the vicinity of Lake Superior; it was deficient elsewhere. In the latitude of Saint Paul and Minneapolis there was only 61 per cent. of the average August precipitation; at Moorhead only 34 per cent., and at Saint Vincent, where the deficiency was greatest, the rainfall amounted to only 19 per cent. of the seasonable average. The precipitation was also unequally distributed as to time. All of it fell in the period from the 1st to the 21st, and none was reported from any station during the last ten days of the month. The greatest daily amounts were as follows: Duluth, 2.80, on the 3d; La Crosse, 2.22, on the 3d; 1.42, on the 5th, and 1.14, on the 6th; Farmington, 1.50, on the 4th; Pine River Dam, 1.28, on the 1st; Grand Meadow, 1.07, on the 2d, and 1.00 on the 19th; Northfield, 1.00, on the 2d.

Wind.—The prevailing direction of wind, southwest.—*Prof. W. W. Payne, Northfield, director; John Healy, Private, Signal Corps, Saint Paul, assistant.*

MISSISSIPPI.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 80; highest monthly mean, 84, at Columbus; lowest monthly mean, 77, at Memphis; maximum, 106, at Columbus, on 2d; minimum, 56, at Aberdeen, on 23d; range for state, 50; greatest local monthly range, 44, at Corinth; least local monthly range, 15, at Pearlinton; greatest daily range, 38, at Corinth, on 14th; least daily range, 1, on 16th, at Pearlinton.

Precipitation (in inches).—Average for the state, 8.25; greatest, 29.08, at Biloxi; least, 3.04, at Macon.—*Prof. R. B. Fulton, Oxford, director; M. J. Wright, jr., Sergeant, Signal Corps, assistant.*

MISSOURI.

The average temperature for August was 74°. The highest temperature reported in the state was 110° at Pro Tem, and the lowest 45° at Ironton. The average of maximum temperatures was 99°.2, and the average of minimum temperatures, 54°, making an average monthly range of 45°.

The average precipitation was 7.02 inches, which was considerably above the normal for August. The greatest amount reported was 11.53 inches at Pro Tem, and the least was 2.07 inches at Keokuk, Iowa. The average number of days on which rain fell was 11.

Thunder-storms extended over the greater part of the state on the 3d, 5th, 6th, 7th, 11th, 12th, and 21st. Of these, the severest occurred on the 6th, 11th, and 12th. Thunder-storms of a more local character occurred on nearly every other date.—*Prof. Francis E. Nipher, Saint Louis, director; G. A. Weber, Sergeant, Signal Corps, assistant.*

NEBRASKA.

The month has been one of extremes of temperature, but on the whole cool, with precipitation varying widely in amount in different localities but averaging about as usual, and well-distributed throughout the month.

The normal temperature for August is 73°.8 and the extremes for the past ten years have been 101°.5 and 38°, both in 1887. The past month has given a mean temperature of 72°.1, a maximum of 103° at Culbertson, and a minimum of 34° at Hay Springs, with a slight frost, which is unprecedented for August. The number of very warm days has been low.

The greatest rainfall has been along the Missouri River, and especially in three localities, the southeast corner of the state, the mouth of the Platte, and the northeastern corner; another centre of heavy rainfall is in Kearney county. North Platte and Crete show the greatest deficiencies, and elsewhere the rainfall has been about normal. The number of rainy days has been about the normal, as well as the number of cloudy days. On the whole the weather has been exceedingly favorable for the growth of crops.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

NEVADA.

The highest temperature reported was 119° at Riverville, Lincoln Co., for five days, from the 23d to 28th; the lowest temperature reported was 26°.0, on the 23d, at Austin. The hottest days reported generally were the 8th, 12th, 23d, and 25th, and the coldest periods were about the 2d, 15th, and 18th.

The usual remarkably large number of sunshiny days, almost destitute of moisture in the air, occurred. All persons suffering from lung troubles must necessarily derive great benefit from this dry air, although it may not be perceptible to them at the time.

The vapor in crossing the mountains was forced up and condensed on them as heretofore. A very extraordinary exception to this, however, occurred at Pioche, Lincoln Co., on the 14th instant, where 3.04 inches fell from 2 to 4.30 p. m. This storm evidently traveled from se. to nw., as 0.14 of an inch fell at El Dorado Canyon on the 14th, 0.25 at Ely on the 14th, 0.06 at Eureka on the 15th, a trace each at Carson City and Wellington on the 16th, and 0.20 at Lewers' Ranch on the 16th.

The thunder-storms, except those of the 14th and 16th at Carson City, were few and unimportant, and occurred on the 12th, 20th, and 30th only.

A heavy frost occurred on the 1st and 2d, damaging tender plants in exposed places. A light frost occurred on the 31st.—*Prof. Charles W. Friend, Carson City, director; E. H. Thompson, Private, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 67.3 (ninety-eight stations); highest monthly mean, 72, at Olneyville; lowest monthly mean, 60, at Berlin Falls; maximum, 98, at Stratford, on the 3d; minimum, 30, at Williamstown, on the 29th; range for New England, 68; greatest local monthly range, 57, at Stratford; least local monthly range, 26, at Block Island; greatest daily range, 42, at Berlin Falls, on the 3d; least daily range, 0, at Manchester, on the 6th.

Precipitation (in inches).—Average for New England, 5.25 (one hundred and twenty-six stations); greatest, 9.50, at Walpole; least, 0.83, at Nantucket.

Wind.—Prevailing direction, southwest (ten stations).—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; O. N. Oswell, Sergeant, Signal Corps, assistant.*

NEW JERSEY.

The mean temperature, 72°.5, is 0°.5 above the average determined from past records of fifty stations. The highest temperatures, above 90°, were recorded at all stations except one on the 4th, 5th, 7th, 8th, and 16th, and the lowest, below 50°, at fifteen stations on the 13th, 22d, 23d, 28th, 29th, 30th, and 31st. The maximum for the month, 98°, was recorded at Tenafly and Oceanic on the 16th, and the minimum, 41°, at Hanover on the 29th.

The average rainfall for the state, 6.13 inches, is 1.39 inches above the average determined from past records of fifty stations. The largest amount reported was 10.53 inches, at Plainfield, Union Co., and the smallest, 2.55 inches, at Egg Harbor City, Atlantic Co.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 72.5; highest monthly

mean, 77.0, at Trenton; lowest monthly mean, 68.6, at Hanover; maximum, 98, at Oceanic and Tenaſſy, on 16th; minimum, 41, at Hanover, on the 29th; range for state, 57.0; greatest local monthly range, 53.0, at Tenaſſy; least local monthly range, 29.0, at Ocean City; greatest daily range, 40.5, at Freehold, on the 30th; least daily range, 2.0, at Lambertville, on the 12th.

Precipitation (in inches).—Average for the state, 6.13; greatest, 10.53, at Plainfield; least, 2.55, at Egg Harbor City.—*Prof. George H. Cook, New Brunswick, director; E. W. McGann, Sergeant, Signal Corps, assistant.*

NORTH CAROLINA.

Temperature (in degrees Fahr.).—Monthly mean, 76.9; highest monthly mean, 80.2, at Southport; lowest monthly mean, 74, at Knoxville, Tenn.; maximum, 102.4, at Kitty Hawk, on the 8th; minimum, 48.5, at Mount Pleasant, on the 24th; range for state, 53.9; greatest local monthly range, 48.5, at Mount Pleasant; least local monthly range, 25.6, at Hatteras.

Precipitation (in inches).—Average for the state, 4.57; greatest, 9.25, at Southport; least, 2.21, at Kitty Hawk.

Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; H. McP. Baldwin, Sergeant, Signal Corps, assistant.*

OHIO.

Temperature (in degrees Fahr.).—The mean temperature of the northern section, 69.2, was 0.9 above the average; the means for the middle and southern sections, 70 and 71.8, respectively, agree exactly with the six-year means for the sections. The mean for the state, 70.4, is 0.4 above the average. The maximum temperature, 102.0, occurred at Logan, on the 3d, and the minimum, 35.0, at Paulding, on the 23d. The mean daily range of temperature, 21.1, is 1.3 below the average for the past six years. The greatest daily range was, 42.6, at Wauseon, on the 29th, and the least, 3.0, at Georgetown, on the 21st. Light frost was reported on the 23d from Sidney, Greenville, Wauseon, Paulding, Newcomerstown, and Canton, on the 28th from Wauseon, and on the 29th from Newcomerstown.

Precipitation (in inches).—General and heavy rains occurred in all sections on the 4th, 7th, 8th, 12th, 16th, 17th, and 21st, and in the southern section on the 18th, 27th, and 31st; general though mostly light rains in all sections on the 1st, 3d, and 6th; local rains in northern section on the 2d, 11th, 31st; in the middle section on the 5th, 20th, and 31st; and in the southern section on the 2d and 5th. The heaviest rainfall in any twenty-four consecutive hours, 3.63, occurred at McConnellsville on the 17th. The rainfall for the northern section was 3.06; for the middle section, 5.70; for the southern section, 7.18. These means are 1.22, 2.07, and 3.30 above the averages for the sections. The mean rainfall for the state, 5.16, was 1.71 above the mean for the month, making the total for the year to September 1 to agree with the six-year average. Thunderstorms were general in all sections on the 1st, 2d, 3d, 4th, 7th, 8th, 11th, 12th, 16th, 17th, 27th, and 30th.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Private, Signal Corps, assistant.*

PENNSYLVANIA.

Temperature (in degrees Fahr.).—The mean monthly temperature, 69.5, is about 2.3 below the average. The greatest departures were in the western portion of the state. Philadelphia was exactly normal. The highest temperatures during the month occurred on the 4th, 8th, and 16th, and were about the same as usually recorded. The coldest periods were the 23d, 28th, and 29th, and the temperature ranged about 3 below that generally observed during August. The maximums were: Lock Haven, 100; Chambersburg, New Bloomfield, and York, 98; Philadelphia and Catawissa, 97.5; Reading, Pottstown, Shamokin, and Selin's Grove, 97. Minimums: Phillipsburg and Somerset, 33; Wellsborough, 34; Bernice, 37; Greenville, 37.8; Smethport, Dyberry, and Charlesville, 38; Honesdale, 39.

Precipitation (in inches).—The rainfall for the month was phenomenal. Its average for the state was 7.05, being nearly 3.00 more than the normal. The excess was largely due to the excessive fall on the 21st. The following totals occurred during this storm: Girardville, 5.65; Selin's Grove, 5.20; Kutztown, 5.07; Huntingdon, 4.80; Lebanon, 4.76; New Bloomfield, 4.75; Scisholtzville and Hollidaysburg, 4.72; Uniontown, 4.53; Reading, 4.52; Somerset, 4.50; Johnstown, 4.49. Other heavy rainfalls occurred on the 12th and 17th. The largest monthly totals were: Drifton, 11.27; Kutztown, 10.95; Indiana, 10.65; Uniontown, 10.23; Selins Grove, 10.12. The only severe storm during the month was on the 21st. The weather was generally favorable for agricultural pursuits. A few light frosts were reported. The corn crop promises to be a large one, and the potato yield above the average. Average number of rainy days, 10; clear, 13; fair, 10; cloudy, 8.

Wind.—Prevailing direction, southwest.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant, in charge.*

SOUTH CAROLINA.

The mean temperature of the month, according to reports rendered, was 77°.8, a similar mean temperature being on record for the same period in 1887.

The mean depth of rainfall was 4.53 inches for the month, while the record for August, 1887, shows a mean depth of 6.54 inches, a deficiency of 2.01 inches as compared with the same period last year. The greatest amount of precipitation occurred at Windsor, where a fall of 6.90 inches was reported for the month. The rainfall, partial in places, gives promise of average crops.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 77.8; highest monthly mean, 82.0, at Timmonsſville; lowest monthly mean, 74.9, at Marion; maxi-

mum, 102.5, at Clinton; minimum, 50.0, at Cedar Springs and Hardeeville; range of temperature for the state, 19.4; greatest local monthly range, 27.7, at Brewer's Mines; least local monthly range, 13.0, at Charleston.

Precipitation (in inches).—Mean depth of rainfall, 4.53; greatest monthly rainfall, 6.90, at Windsor; least monthly rainfall, 1.52, at Kingſtree; average number of rainy days, 10.0, as against 11.4 for August, 1887.

Wind.—Prevailing direction, southwest.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

TENNESSEE.

The meteorological conditions showed several abnormal features, the chief of which were the severe gale of the 20th and 21st and the excessive rainfall during the last half of the month, together with the large percentage of cloudiness.

The mean temperature was 76°.2, one degree above the August mean of the past six years. The highest local mean was 81°, at Woodstock, and the lowest, 72°.2, at Fostoria. The maximum temperature observed was 104°, on the 1st and 2d, at Hohenwald, and was the highest in August during the past six years, the next being 103°, in 1886 and 1887. The maximum temperatures were generally high, 98° and 99° being recorded at several stations. The minimum temperature observed was 50°, on the 24th, at Jacksborough; this was the highest August minimum during the six years, except that in 1886, 52°, and 1885, 50°. The mean daily ranges of temperature were slightly less than the normal. The highest temperature was generally recorded on the 2d and 3d in the eastern and middle divisions, and on the 1st, 2d, and 5th in the western division. The lowest temperature was generally recorded on the 23d and 24th, although at a few stations in the middle and western divisions the lowest was noted on the 10th, 13th, and 14th.

The mean precipitation was 7.06 inches, much of which, especially in the middle division, fell on the last four days of the month. Of this amount, the eastern division received an average of about 4.5 inches, the middle division about 7.75 inches, and the western division nearly 9 inches. Until the 16th the rains were mostly light and local, but from that time to the end of the month, excepting the cool period, 23d to 26th, inclusive, the rains were almost daily, and in many instances very heavy. The greatest rainfall was at Ashwood, 11.93 inches, and of this amount, 8.59 inches fell during the four days ending with the 31st, and on that day 5.44 inches fell at that station; for August this is probably unprecedented in the history of that country.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

The data used in this review comprises monthly reports and summaries from sixteen special cotton-region stations, nine regular stations of the Signal Service, seven voluntary observers, and the 8 a. m. weather maps issued at Galveston. The weather maps for August exhibit some unusual meteorological features: First, there was extremely hot weather which was abruptly terminated and followed by exceptionally cool weather. Second, excessive precipitation occurred at widely-separated stations, while at intermediate stations there was scarcely the normal amount. Thus at Galveston, in less than seventy-two hours, over twelve inches of rain fell, while at Houston, fifty miles distant, less than three inches were reported. Again, at Tyler, in less than four days, over thirteen inches fell, while at Longview, there was less than one-sixth of that amount. During the first of the month dry and hot weather prevailed. After the 10th there was a change to cooler, which conditions continued, with light showers here and there, until the 22d, when copious rains set in along the coast, and, during the next eight days, gradually extended northward through the state producing decidedly cool weather, which continued to the end of the month. During the heated term, from the 1st to the 10th, intensely hot weather existed in the Northern States, the temperature at various points in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Ohio, and Wisconsin ranging from 92° to 105°. In Chicago and Saint Louis, there were scores of prostrations and deaths. Shops and factories were compelled to shut down, and farm hands were driven to shelter. Yet in Texas the temperature was not abnormally high and there were few, if any, fatalities.

Temperature (in degrees Fahr.).—The average temperature for the state for August, was 82; the mean maximum temperature was 92; and the mean minimum temperature 73. Compared with the month of July, the average temperature for August was one degree lower. The highest temperature reported at any station was 104, at Fort Elliott, on the 5th, and Rio Grande City, on the 19th. The lowest temperature, 57, occurred at Fort Elliott on the 31st. The absolute range of temperature for the state was 47. The greatest monthly range of temperature was 47, at Fort Elliott; and the least monthly range, 21, at Corpus Christi. Average range along the coast 22; in the interior, 33. The highest monthly mean temperature at any station was 87.6, at Cuero; lowest, 73.9, at Fort Elliott.

Precipitation (in inches).—The average rainfall for Texas for August was 5.48. This amount is 3.23 in excess of the average for July of this year, and somewhat in excess of the average for August as deduced from observations covering a period of several years. The average monthly precipitation for April, May, June, July, and August was 5.10. The following named places report monthly precipitation exceeding five inches: Austin, Cleburne, Cedar Hill, Dallas, Decatur, Galveston, Luling, San Antonio and Tyler; and the following named places amounts exceeding ten inches: Dallas, Galveston, and Tyler. The greatest amount of precipitation in any twenty-four hours occurred at Galveston on the 24th, 5.96. The greatest monthly precipitation at any station was 17.85, at Tyler; and the least, 95, at Brownsville.—*S. O. Young, M. D., Galveston, director; Allen Buell, Sergeant, Signal Corps, assistant.*

Meteorological record of voluntary observers and Army post surgeons, August, 1888.

The maximum and minimum temperatures at stations marked thus (°) are from readings of other than standard instruments.

Stations.	Temperature. (Fahrenheit.)				Precip'n.	Stations.	Temperature. (Fahrenheit.)				Precip'n.
	Max.	Min.	Mean.	Ins.			Max.	Min.	Mean.	Ins.	
<i>Alabama.</i>						<i>Dakota.</i>					
Bernuda.....	95	72	80.4	5.65		Brookings.....	94	40	63.2	3.21	
Carrollton.....	93	74	72.8	6.44		Davenport.....	95	34	64.4	1.24	
Citronelle.....	97	64	80.4	10.00		Fort A. Lincoln.....	108	26	.....	0.58
Edwardsville.....	96	66	81.0	6.35		Fort Meade.....	90	40	66.5	3.54	
Eufaula.....	94	62	78.9	11.30		Fort Pembina.....	99	39	.....	0.45
Florence.....	93	62	79.3	9.07		Fort Randall.....	100	42	70.0	3.71	
Fort Deposit.....	93	53	78.9	6.81		Fort Sisseton.....	95	42	64.2	3.10	
Gadsden.....	93	57	76.9	4.12		Fort Sully.....	100	46	69.8	2.40	
Greensborough.....	95	70	79.4	9.20		Fort Totten.....	99	35	63.8	0.98	
Livingston.....	93	68	80.0	9.60		Fort Yates.....	99	41	67.9	2.32	
Marion.....	93	65	79.7	11.52		Garden City.....	95	43	63.6	2.47	
Mt. Vernon B'ks.....	97	60	79.9	5.66		Goddard.....	97	33	69.1	0.35	
Mount Willing.....	97	63	80.0	3.71		Grand Forks.....	97	35	69.1	0.35	
New Market.....	93	64	76.0	5.95		Highmore.....	98	42	67.1	3.10	
Pine Apple.....	96	63	82.0	1.91		Kimball.....	94	51	63.8	2.15	
Seima.....	97	73	82.4	11.39		New England City.....	93	39	63.8	1.35	
Talladega.....	96	57	79.9	6.76		Webster.....	97	42	66.5	4.14	
Troy.....	94	71	73.6	10.97		Woonsocket.....	99	37	67.9	0.82	
Tuscaloosa.....	96	64	71.5	9.71		<i>District of Columbia.</i>					
Tusculum.....	96	63	76.5	9.10		Distribut'g res'v'r.....	97	56	77.0	4.48	
Union Springs.....	96	68	79.0	4.15		Kendall Green.....	95	57	76.9	4.36	
Uniontown.....	96	66	80.2	11.69		Receiving res'v'r.....	95	57	76.9	4.36	
Valley Head.....	93	64	79.2	4.61		Washington aq.	99	59	80.0	.....
<i>Arizona.</i>						<i>Florida.</i>					
Antelope Valley.....	.....	.....	.....	0.34		Altamonte Springs.....	96	70	80.6	9.74
Barstow.....	108	58	84.0	0.17		Alva.....	104	71	78.0	8.34	
Cedar Springs.....	94	56	.....	2.75		Archer.....	101	67	85.0	5.91
Fort Huachuca.....	116	68	92.0	0.10		Duke.....	96	74	80.2	3.96	
Fort McDowell.....	113	47	.....	1.37		Fort Meade.....	95	78	86.0	7.00
Fort Mojave.....	.....	.....	.....	0.74		Homeland.....	97	73	82.5	5.60
Globe.....	99	80	74.0	0.06		Manatee.....	94	74	83.0	9.96	
Holbrook.....	98	41	.....	0.60		St. Francis Bar'cks.....	93	71	81.4	4.10
Prescott Junction.....	.....	.....	.....	1.43		Tallahassee.....	99	70	80.8	7.41
Tevison.....	.....	.....	.....	0.63		<i>Georgia.</i>				
Tombstone.....	108	48	78.0	0.23		Andersonville.....	102	52	77.9	4.00	
Tucson.....	100	48	78.0	0.14		Athens.....	100	54	78.2	4.07	
Winslow.....	97	49	65.4	1.44		Duck.....	.....	.....	72.1	8.10
Williams.....	.....	.....	.....	0.06		Forsyth.....	.....	.....	81.0	3.50
Willow Springs.....	.....	.....	.....	0.58		Marietta.....	95	55	77.5	2.94
<i>Arkansas.</i>						<i>Idaho.</i>					
Alexander.....	100	64	80.2	0.20		Milledgeville.....	90	60	77.4	4.60	
Brinkley.....	105	64	85.4	0.20		<i>Illino.</i>					
Camden.....	93	72	81.0	3.67		Boise Barracks.....	102	47	75.7	0.28	
Conway.....	96	64	79.0	4.08		Fort Sherman.....	98	42	.....	0.26
Dallas.....	94	61	77.4	6.73		Lewiston.....	105	61	.....	0.36
Dayton.....	99	72	81.9	5.20		<i>Illinois.</i>					
Deval's Bluff.....	99	59	79.6	7.47		Aledo.....	100	46	.....	3.22
El Dorado.....	94	64	78.9	1.05		Aurora.....	94	42	70.9	5.66	
Forrest City.....	97	60	79.1	1.64		Beason.....	98	42	69.2	2.85	
Heber.....	98	51	77.4	2.90		Belvidere.....	96	52	68.6	1.95	
Hot Springs.....	93	51	74.1	.....		Benton.....	103	54	73.2	7.42
Lead Hill.....	110	62	80.3	11.53		Brush Hill.....	95	56	73.0	1.90	
Lonoke.....	96	64	80.3	7.75		Cedarville.....	93	53	68.7	1.53	
Malvern.....	103	64	84.5	7.45		Centralia.....	102	56	75.0	7.80	
Monticello.....	98	64	81.9	4.47		Charleston.....	98	46	77.4	3.25	
Newport.....	101	67	80.0	8.33		Collinsville.....	96	50	73.5	3.17	
Oceola.....	98	61	78.4	8.33		Dwight.....	102	46	71.7	3.27	
Ozone.....	98	61	78.4	8.33		Fairfield.....	102	55	74.3	5.91	
Pine Bluff.....	100	63	81.4	5.34		Flora.....	100	44	73.0	7.66	
Portia.....	101	63	78.5	9.75		Griggsville.....	99	48	74.1	3.86	
Prencott.....	96	65	81.2	0.28		Golconda.....	98	62	76.7	4.48	
Stuttgart.....	96	65	81.2	0.28		Hennepin.....	102	59	71.0	1.25	
Texarkana.....	102	67	83.3	0.51		Irishtown.....	100	58	73.8	7.18	
Washington.....	95	67	83.2	8.50		Jacksonville.....	94	51	72.7	1.53	
<i>British Columbia.</i>						<i>Idaho.</i>					
New Westminster.....	85	53	66.4	0.45		Joliet.....	90	40	65.5	6.00	
<i>California.</i>						<i>Idaho.</i>					
Alcatraz Island.....	66	48	56.2	0.00		Jordan's Grove.....	101	52	74.3	10.22	
Anderson.....	113	68	83.5	0.28		Kampville.....	99	53	73.6	5.20	
Angel Island.....	78	53	.....	0.00		Lacon.....	94	52	74.2	3.20
Banning.....	104	54	.....	0.00		Lake Forest.....	93	47	67.9	3.46
Benicia Barracks.....	93	56	71.6	0.00		Lark.....	90	51	71.0	3.91	
Fort Bidwell.....	97	48	75.3	.....		Martinsville.....	96	56	73.1	5.71
Fort Gaston.....	101	46	78.3	.....		Mascoutah.....	100	58	71.6	5.60
Fort Mason.....	70	38	59.3	0.00		Mattoon.....	101	43	70.8	3.48	
Georgetown.....	104	46	77.7	0.00		McLeansborough.....	109	51	74.0	7.76	
Lewis Creek.....	105	64	85.0	0.00		Mount Morris.....	98	48	72.2	.....
Needles.....	116	65	.....	0.05		Oney.....	96	57	73.5	6.78
Oakland.....	86	52	61.6	.....		Oneida.....	96	51	69.7	5.25
Oroville.....	102	58	81.8	.....		Oquawka.....	102	56	73.2	3.25
Sacramento.....	100	48	74.4	.....		Oswego.....	96	48	68.7	1.09
Salinas.....	76	52	59.5	0.00		Ottawa.....	95	50	67.4	1.77	
Santa Barbara.....	84	52	66.3	.....		Palestine.....	97	47	74.2	4.50
Santa Maria.....	90	46	65.0	.....		Pana.....	99	53	72.7	6.66
Willow.....	109	48	81.1	.....		Paris.....	94	48	70.4	4.09
<i>Colorado.</i>						<i>Idaho.</i>					
Fort Lewis.....	88	41	62.0	1.14		Pekin.....	102	45	73.5	2.38	
Georgetown.....	78	44	57.1	1.98		Peoria.....	101	52	72.9	2.30	
<i>Connecticut.</i>						<i>Idaho.</i>					
Canton.....	90	42	.....	3.72		Philie.....	94	40	71.0	0.37
Colchester.....	90	46	69.5	.....		Pontiac.....	102	42	72.5	0.80
Hartford.....	92	45	70.5	4.81		Richview.....	98	49	73.4	7.43	
Mansfield.....	88	44	67.3	4.97		Riley.....	91	46	66.1	4.23	
Middletown.....	91	46	68.5	6.14		Rockford.....	90	46	67.4	1.99	
New Hartford.....	90	44	67.6	3.90		Sandwich.....	99	55	72.5	3.83	
Shelton.....	91	46	68.4	7.43		South Evanston.....	85	43	.....	4.14
Southington.....	90	48	67.8	3.15		Summer.....	98	48	66.3	5.46	
Thompson.....	87	45	67.8	.....		Sycamore.....	96	43	66.3	4.03
Voluntown.....	94	52	70.6	4.95		Vandalia.....	100	51	73.0	4.70	
Waterbury.....	94	50	68.9	4.53		Watseka.....	99	57	69.1	0.61	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>Indiana.</i>					<i>Indiana—Cont'd.</i>				
Angola.....	94	44	69.5	Ins.	Salina.....	96	70	81.7	4.00
Blue Lick.....	96	54	73.5	11.59	Sedan.....	104	63	77.2	7.10
Butlerville.....	100	56	75.5	9.02	Seneca.....	101	50	72.0	3.58
Columbia City.....	94	44	72.2	0.54	Sharon Springs.....	.....	.....	.....	4.10
Columbus.....	98	54	73.0	5.31	Stockton.....	.....	.....	.....	1.67
Connersville.....	90	54	69.1	5.73	Tribune.....	100	49	72.6	1.20
Delphi.....	98	53	71.6	1.12	Ulysses.....	.....	.....	.....	9.00
Degonia Springs.....	95	53	75.1	11.30	Wakefield.....	105	36	76.0	4.84
Farmland.....	94	46	71.1	5.05	Wellington.....	105	36	79.1	5.15
Huntingburg.....	99	59	74.7	9.08	Wilson.....	90	57	72.8	2.50
Jeffersonville.....	96	51	74.1	13.61	Wilson.....	102	56	73.8	5.10
Laconia.....	106	60	.....	.....	Yates Centre.....	101	54	74.1	6.87
Lafayette.....	97	40	70.3	2.09	<i>Kentucky.</i>				
Lagrange.....	95	42	69.0	1.14	Ashland.....	96	52	75.2	10.70
Logansport.....	95	43	74.4	0.98	Bowling Green.....	102	53	.....	8.31
Marion.....	100	53	70.3	0.30	Frankfort.....	102	48	74.2	10.85
Mausy.....	97	41	68.6	4.84	Madisonville.....	94	64	77.2	5.07
Mount Vernon.....	96	51	79.0	11.16	Owensborough.....	95	56	75.8	.....
Princeton.....	106	53	75.6	6.50	Whitesburg.....	84	60	68.4	5.67
Richmond.....	93	44	71.1	3.95	<i>Louisiana.</i>				
Rockville.....	97	50	68.7	1.20	Abbeville.....	93	73	81.2	6.95
Salem.....	93	56	72.7	8.65	Alexandria.....	99	65	81.7	6.60
Scaleville.....	102	53	77.3	10.61	Amite.....	97	67	80.8	16.16
Sunman.....	95	47	71.2	6.24	Baton Rouge.....	91	65	78.8	12.30
Seymour.....	96	43	66.3	4.03	Cheneyville.....	94	61	77.6	5.95
Vevay.....	97	50	74.1	8.04	Clinton.....	96	61	76.5	14.05
Worthington.....	94	54	71.1	5.89	Coushatta.....	99	67	80.5	2.53
<i>Indian Territory.</i>					Donaldville.....	94	69	79.0	15.83
Fort Gibson.....	102	56	79.9	2.67	Farmersville.....	97	70	82.4	3.67
Fort Reno.....	104	58	.....	2.82	Franklinton.....	90	73	79.8	14.90
Fort Supply.....	109	61	78.9	2.30	Girard.....	.....	.....	.....	7.65
<i>Iowa.</i>					Grand Coteau.....	94	69	79.9	5.07
Amama.....	95	45	69.8	3.67	Keatchie.....	99	69	79.6	4.55
Bancroft.....	96	47	68.1	3.46	Lake Providence.....	102	72	86.8	10.86
Cedar Rapids.....	95	46	68.1	2.42	Lafayette.....	97	72	82.2	9.97
Clarinda.....	98	55	73.0	4.42	Liberty Hill.....	102	67	82.5	2.92
Clinton.....	100	46	69.4	3.05	Luling.....	96	67	.....	14.47
Cresco.....	93	50	70.0	5.24	Mandeville.....	97	70	80.8	19.61
Cromwell.....	110	53	.....	8.03	Maurepas.....	93	72	81.0	7.75
Des Moines.....	99	46	70.9	.....	Marksville.....	94	69	78.3	7.33
Dysart.....	98	44	.....	2.40	Melville.....	.....	.....	.....	9.04
Elkader.....	94	54	69.0	2.10	Minden.....	100	69	81.6	2.27
Fayette.....	97	40	65.8	2.42	Morgan City.....	93	71	80.2	.....
Fort Madison.....	96	57	.....	4.08	Monroe.....	96	66	81.0	6.96
Glenwood.....	100	46	75.1	.....	Natchitoches.....	98	71	82.8	1.91
Glenwood.....	101	50	74.5	7.56	New Iberia.....	95	71	81.1	13.73
Grinnell.....	91	51	70.2	2.95	N. La. Ex. Station.....	99	65	.....	4.15
Hampton.....	95	43	.....	4.99	Point Pleasant.....	95	72	79.2	7.25
Humboldt.....	93	43	57.9	3.75	Port Eads.....	93	72	81.3	13.48
Independence.....	93	56	69.0	2.58	Saint Joseph.....	.....	.....	.....	12.12
Iowa City.....	93	54	72.3	4.98	Saint Martinville.....	92	.....	.....	11.60
Logan.....	.....	.....	73.6	6.44	Sugar Ex. Station.....	95	70	.....	17.50
Manion.....	96	56	77.0	3.46	Thibodeaux.....	.....	.....	.....	15.59
Monticello.....	94	46	69.5	1.71	Trinity.....	94	70	80.0	10.70
Maquoketa.....	96	.....	.....	4.33	Vidalia.....	101	70	83.1	12.36
Mount Pleasant.....	90	56	71.2	5.43	<i>Maine.</i>				
Mount Vernon.....	99	56	72.0	3.33	Bar Harbor.....	81	48	61.9	4.29
Muscatine.....	98	42	70.7	7.24	Belfast.....	78	54	62.0	.....
Osage.....	.....	.....	.....	2.71	Calais.....	80	44	.....	4.54
Oscola.....	87	48	65.5	6.50	Cornish.....	87	51	65.8	4.48
Oskalooza.....	96	50	72.5	6.90	Fairfield.....	83	42	64.2	3.96
Oskalooza.....	.....	.....	.....	7.38	Gardiner.....	85	48	64.1	4.33
Sac City.....	95	51	67.3	4.81	Kent's Hill.....	82	47	64.2	3.65
Smithland.....	.....	.....	.....	5.12	Lewiston.....	86	50	65.6	4.13
Vinton.....	.....	.....	68.5	2.91	Mayfield.....	80	45	61.0	6.88
Washington.....	.....	.....	.....	3.59	Orono.....	83	45	63.5	5.49
<i>Kansas.</i>					Petit Manan.....	74	50	57.5	.....
Allison.....	98	51	.....	1.90	<i>Maryland.</i>				
Belleville.....	102	.....	.....	4.23	Barren Creek Sp'gs.....	93	56	78.8	2.03
Brookville.....	113	59	.....	4.40	Cumberland.....	90	48	69.2	8.00
Cawker City.....	100	54	.....	1.30	Fallston.....	93	49	72.3	3.15
Cold Water.....	100	55	78.0	3.60	Fort McHenry.....	91	56	76.2	6.56
Concordia.....	102	53	74.0	4.97	Gaithersburg.....	96	53	.....	4.00
Cunningham.....	106	57	75.8	7.28	Great Falls.....	92	52	75.9	3.98
Elco.....	101	56	.....	9.08	McDonough.....	93	55	74.4	4.70
Elk Falls.....	102	55	.....	7.25	Woodstock.....	97	46	72.0	5.49
Ellsworth.....	104	42	.....	4.30	<i>Massachusetts.</i>				
Englewood.....	.....	.....	77.6	2.81	Amhersta.....	87	43	67.4	4.29
Fort Leavenworth.....	96	54	.....	9.36	Amherst.....	86	43	67.9	5.84
Gibson.....	105	52	76.0	1.04	Beverly Farm.....	85	48	65.9	6.17
Globe.....	97	60	73.0	8.05	Blue Hill Observ'y.....	88	48	66.4	6.38
Goodland.....	98	48	69.0	2.35	Blue Hill Observ'y.....	88	48	68.6	6.59
Halstead.....	102	57	77.0	4.37	Blue Hill Observ'y.....	91	44	68.4	6.26
Havensville.....	104	56	.....	8.12	Cambridge.....	85	51	68.8	7.15
Hays City.....	104	60	.....	4.63	Cambridge.....	89	53	70.0	7.08
Fort Hays.....	106	52	.....	4.00	Chestnut Hill.....	89	49	68.8	7.10
Hill City.....	.....	.....	.....	5.50	Cotuit.....	86	50	69.4	1.78
Horton.....	103	56	75.0	3.67	Deerfield.....	89	46	68.4	4.10
Hugoton.....	.....	.....	.....	3.90	Deerfield.....	90	50	69.3	.....
Independence.....	104	56	76.5	5.00	Dudley.....	92	45	68.3	5.24
Lawrence.....	99	52	72.9	9.07	Fall River.....	96	50	68.2	5.04
Leoti.....	102	50	.....	2.60	Framingham.....	92	46	68.1	6.86
Mackaville.....	.....	.....	.....	1.90	Fitchburg.....	88	51	66.9	5.01
Manhattan.....	103	50	74.2	4.30	Fitchburg.....	85	51	66.5	4.79
Manhattan.....	104	49	74.0	4.46	Gilbertville.....	90	42	69.5	4.94
McAlister.....	106	50	.....	3.00	Groton.....	87	48	68.4	4.20
McPherson.....	.....	.....	.....	4.99	Lake Cochituate.....	95	40	69.4	6.44
Morse.....	94	56	75.0	11.23	Lawrence.....	90	48	69.3	4.24
Oakley.....	104	50	.....	2.30	Long Plain.....	86	50	.....	4.28
Osborne.....	102	.....	.....	1.75	Lowell.....	87	51	69.2	4.86
Peabody.....	.....	.....	.....	8.58	Ludlow.....	88	38	66.1	4.16
Pence.....	100	54	.....	3.59	Lynn.....	81	50	68.0	6.80
Port Riley.....	103	54	73.6	3.66	Manfield.....	90	45	68.5	7.00
Rome.....	107	60	.....	4.62	Middleborough.....	95	46	67.8	5.56
Santa Fe.....	.....	.....	.....	10.00	Milton.....	88	48	67.1	6.14

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Massachusetts—Con.</i>				<i>Ins.</i>	<i>Mississippi—Cont'd.</i>				<i>Ins.</i>
Monson	88	41	67.7	4.00	Biloxi	90	72	79.5	10.08
Nahant	88	51	67.6	7.48	Columbus	103	85	84.0	6.73
Nantucket a.	85	51	69.4	0.83	Corinth	102	85	80.0	5.53
Nantucket b.	81	57	67.3	0.87	Edwards	98	80	82.0	6.70
New Bedford a.	82	50	66.6	4.87	Greenville	98	70	81.0	10.39
New Bedford b.	86	50	68.6	5.02	Hernando	98	59	79.0	10.50
Newburyport a.	87	49	67.1	5.35	Jackson	93	63	80.1	8.63
Northampton	80	47	70.4	5.11	Lake	95	66	79.0	7.29
Plymouth	87	50	69.7	5.14	Logtown	91	73	79.0	
Princeton	84	42	65.4	5.14	Macon	101	80	82.0	3.04
Provincetown	88	55	69.0	5.30	Meridian	103	65	82.0	6.70
Rowe	84	48	64.5	9.50	Natchez	94	70	80.0	9.72
Salem	88	53	68.3	5.35	Okalona	101	63	82.0	4.94
Somerset	84	49	72.0	5.35	Palo Alto	96	64	79.1	5.82
Springfield	85	50	70.4	4.03	Pearlington	90	74	80.0	
Swampscott	85	50	67.7	6.88	Starkville	92	64	81.0	6.70
Taunton a.	83	48	68.3	4.04	Water Valley	97	67	82.0	10.57
Taunton b.	80	47	68.5	5.09	Waynesborough	97	67	82.0	10.57
Taunton c.	80	42	68.9	5.03	West Point	96	65	80.0	7.02
Warwick	82	42	63.6	6.72	Yazoo City	90	65	80.0	8.39
Wellesley	81	45	68.6	6.72	<i>Missouri.</i>				
Westborough	88	50	68.6	5.93	Arlington	90	65	80.0	8.62
Williamstown	88	50	68.6	4.48	Carthage	90	65	80.0	8.62
Worcester	88	50	68.6	4.48	Conception	94	55	70.5	9.82
<i>Michigan.</i>					Fayette	92	54	72.6	6.96
Adrian	86	35	69.8	1.55	Fox Creek	92	54	72.6	4.13
Alma	86	35	69.8	1.55	Frankford	96	50	73.0	6.45
Atlantic	86	35	69.8	1.55	Hermann	96	50	73.0	6.45
Bad Axe	86	35	69.8	1.55	Ironton	88	45	65.8	8.25
Battle Creek	86	35	69.8	1.55	Kirkville	98	54	71.7	2.67
Bear Lake	86	35	69.8	1.55	Lamonte	108	59	75.5	7.65
Belle Branch	86	35	69.8	1.55	Mexico	97	36	76.2	9.50
Benzonia	86	35	69.8	1.55	Miami	100	36	76.2	9.50
Benton Harbor	86	35	69.8	1.55	Oakwood	100	36	76.2	9.50
Berlin	86	35	69.8	1.55	Oregon	100	36	76.2	9.50
Big Rapids	86	35	69.8	1.55	Ozark	100	36	76.2	9.50
Birmingham	86	35	69.8	1.55	Pierce City	103	57	75.1	11.90
Fort Brady	86	35	69.8	1.55	Princeton	106	55	76.1	5.40
Bronson	86	35	69.8	1.55	Saint Charles a	100	48	70.0	4.51
Buchanan	86	35	69.8	1.55	Saint Charles b	100	48	70.0	4.51
Calumet	86	35	69.8	1.55	Savannah	90	50	70.0	9.05
Cassopolis	86	35	69.8	1.55	Sedalia	103	55	76.6	5.83
Charlevoix	86	35	69.8	1.55	Shelbina	98	47	73.1	10.40
Chase	86	35	69.8	1.55	Steelville	104	58	76.6	8.81
Coldwater	86	35	69.8	1.55	Warrensburg	104	58	76.6	8.81
Colon	86	35	69.8	1.55	Westport	97	55	70.0	8.25
Columbia	86	35	69.8	1.55	<i>Montana.</i>				
Corunna	86	35	69.8	1.55	Fort Keogh	98	43	70.0	2.60
Deer Lake	86	35	69.8	1.55	Fort Shaw	97	39	67.6	0.88
Eden	86	35	69.8	1.55	Virginia City	91	41	63.0	0.88
Evart	86	35	69.8	1.55	<i>Nebraska.</i>				
Fletcher	86	35	69.8	1.55	Ashland	90	40	70.0	3.30
Fremont	86	35	69.8	1.55	Crete	90	40	70.0	3.30
Gaylord	86	35	69.8	1.55	Creighton	90	40	70.0	3.30
Grand Rapids	86	35	69.8	1.55	Culbertson	103	52	74.8	1.64
Hanover	86	35	69.8	1.55	David City	102	46	72.6	5.54
Harrisville	86	35	69.8	1.55	De Soto	90	48	72.6	5.54
Hart	86	35	69.8	1.55	Fairbury	98	48	72.6	5.54
Hastings	86	35	69.8	1.55	Falls City	100	54	73.1	5.45
Hillman	86	35	69.8	1.55	Fort Niobrara	95	40	69.4	2.66
Hudson	86	35	69.8	1.55	Fort Robinson	92	39	64.7	1.46
Ionia	86	35	69.8	1.55	Fort Sidney	96	43	70.0	1.12
Kalamazoo	86	35	69.8	1.55	Fremont	98	41	70.0	4.59
Lansing	86	35	69.8	1.55	Genoa	96	48	70.0	4.49
Lathrop	86	35	69.8	1.55	Hay Springs	96	48	70.0	4.49
Madison	86	35	69.8	1.55	Kimball	95	43	70.0	4.49
Manistee	86	35	69.8	1.55	Lincoln	100	50	70.0	4.49
Marshall	86	35	69.8	1.55	Marquette	100	52	70.0	4.49
May	86	35	69.8	1.55	Minden	100	52	70.0	4.49
Mio	86	35	69.8	1.55	Nebraska City	100	52	70.0	4.49
Mottville	86	35	69.8	1.55	North Loup	100	52	70.0	4.49
Mount Pleasant	86	35	69.8	1.55	Ravenna	100	52	70.0	4.49
Omer	86	35	69.8	1.55	Red Willow	100	52	70.0	4.49
Ovid	86	35	69.8	1.55	Syracuse	98	62	73.4	2.46
Petersburg	86	35	69.8	1.55	Tecumseh	100	53	72.6	4.89
Pontiac	86	35	69.8	1.55	Valentine	100	53	72.6	4.89
Pulaski	86	35	69.8	1.55	Weeping Water	100	53	72.6	4.89
Saint Johns	86	35	69.8	1.55	West Hill	100	53	72.6	4.89
Sand Beach	86	35	69.8	1.55	West Point	100	53	72.6	4.89
Sault de Ste. Marie	86	35	69.8	1.55	<i>Nevada.</i>				
State Capitol	86	35	69.8	1.55	Austin	90	26	70.0	0.00
Thornville	86	35	69.8	1.55	Battle Mountain	93	72	76.4	0.00
Traverse City a	86	35	69.8	1.55	Browns	97	70	77.5	0.00
Traverse City b	86	35	69.8	1.55	Eldorado Canyon	117	66	70.0	0.60
West Branch	86	35	69.8	1.55	Elko	103	31	70.0	0.00
Ypsilanti	86	35	69.8	1.55	Ely	90	37	70.0	0.00
<i>Minnesota.</i>					Eureka	98	55	70.0	0.06
Farmington	86	35	69.8	1.55	Fort McDermitt	96	47	72.3	T.
Fort Snelling	86	35	69.8	1.55	Genoa	90	45	70.0	
Grand Meadow	86	35	69.8	1.55	Mill City	100	71	79.3	0.52
Le Sueur	86	35	69.8	1.55	Palisade	91	75	80.1	
Mankato	86	35	69.8	1.55	Pioche	96	41	70.0	3.68
Medford	86	35	69.8	1.55	Rioville	114	87	101.1	0.17
Minneapolis	86	35	69.8	1.55	Ruby Hill	81	42	70.0	0.10
Morris	86	35	69.8	1.55	Stillwater	103	40	70.0	
Northfield	86	35	69.8	1.55	Tuscarora	90	42	70.0	
Pine River	86	35	69.8	1.55	Verdi	88	61	68.1	
Red Wing	86	35	69.8	1.55	<i>New Hampshire.</i>				
Rochester	86	35	69.8	1.55	Antrim	90	40	70.0	5.36
Rolling Green	86	35	69.8	1.55	Belmont	90	40	70.0	2.90
Spring Valley	86	35	69.8	1.55	Berlin Falls	86	35	60.0	
<i>Mississippi.</i>					Berlin Mills	86	35	64.8	2.75
Aberdeen	97	56	80.0	4.40	Bristol	86	35	64.8	2.75
Abertish	97	56	80.0	4.40	Concord	89	45	66.8	3.67
Batesville	95	63	79.0	9.66					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.	
	Max.	Min.	Mean			Max.	Min.	Mean		
<i>N. Hampshire—Con.</i>					<i>Ohio—Cont'd.</i>					
Hanover	83	41	65.0	6.55	Greenville	92	45	69.1	3.87	
Lake Village	83	41	65.0	6.55	Hanging Rock	95	49	71.2	8.59	
Manchester a.	90	44	67.5	4.65	Hiram	95	49	71.2	8.59	
Manchester b.	91	45	67.0	4.72	Hudson	96	50	72.3	7.80	
Manchester c.	91	48	67.5	4.60	Jacksonborough	96	50	72.3	7.80	
Nashua	91	45	68.1	4.03	Jefferson	98	40	66.1	3.72	
North Conway	91	44	64.8	3.87	Logan	102	44	69.9	6.46	
Plymouth	92	46	65.0	3.91	Lordstown	90	38	67.7	4.46	
Stratford	98	41	66.2	6.00	Marietta	93	47	71.6	11.55	
Walpole	96	44	64.0	9.50	McConnellsville	96	44	70.0	6.17	
West Milan	87	38	61.3	5.54	Napoleon	95	45	72.1	3.02	
Wier's Bridge	92	40	65.0	4.11	New Alexandria	92	42	69.5	8.38	
Wolfeborough	92	40	65.0	3.99	New Athens	90	48	69.2	5.10	
<i>New Jersey.</i>					<i>New Comerstown</i>					
Beverly	94	48	72.9	6.14	North Lewisburg	99	47	75.4	6.50	
Billingsport L. H.	92	54	76.6	6.14	Oberlin	98	45	69.2	2.10	
Bridgeton	93	58	75.8	5.49	Ottawa	96	42	70.9	5.85	
Cape May, C. H.	93	48	73.6	5.49	O. S. University	96	42	70.9	5.85	
Clayton	95	51	72.1	4.93	Paulding	98	35	69.4	1.31	
Egg Harbor City	95	47	71.3	2.58	Pomeroy	101	46	70.4	3.50	
Freehold	92	44	71.0	4.03	Portsmouth	94	50	72.2	7.63	
Gillette	96	48	72.3	7.39	Quaker City	91	44	70.4	8.52	
Hanover	90	41	68.6	6.51	Ruggles	92	45	67.8	3.25	
Highland Park	93	49	71.5	5.58	Sidney	96	46	73.3	3.87	
Imlaystown	95	49	71.7	5.07	Springborough	96	46	73.3	3.87	
Lambertville	93	53	71.3	5.58	Tiffin a	95	45	69.5	1.06	
Locktown	94	47	71.9	7.77	Upper Sandusky	94	43	70.3	4.17	
Moorestown	93	50	72.3	6.25	Wauseon	98	38	69.9	1.95	
New Brunswick a.	92	54	72.4	5.93	Waverly	98	38	69.9	1.95	
New Brunswick b.	93	50	72.4	5.93	Waynesville	95	45	69.5	1.06	
New Brunswick c.	94	48	71.8	5.96	Westerville	95	44	67.5	7.72	
Newark	92	52	73.0	7.06	West Milton	103	47	74.0	5.50	
Ocean City	95	60	74.8	7.10	Weymouth	94	43	70.3	4.17	
Oceanic	96	54	75.4	4.38	Wooler	95	43	69.5	1.06	
Paterson	93	51	70.9	8.43	Yellow Springs	83	42	70.0	4.07	
Plainfield	96	45	70.6	10.53	Youngstown	92	44	70.0	3.04	
Rancocas	93	52	70.6	5.77	<i>Oregon.</i>					
Readington *	96	60	76.3	.....	Albany	94	48	68.7	.....
Somerville	92	47	71.5	6.91	Bandon *	70	50	59.1	.....
South Orange	92	50	70.1	8.33	East Portland *	92	56	69.0	.....
Tenafly	98	45	70.8	6.30	Eola	88	55	66.7	.....
Tom's River	92	46	71.7	4.69	McMinnville	93	45	65.0	0.00	
Trenton	94	55	77.0	6.87	Mount Angel	94	48	72.0	0.00	
Union	91	54	70.4	7.20	Yaquina Lt. House	70	43	56.3	0.00	
<i>New Mexico.</i>					<i>Pennsylvania.</i>					
Coolidge	100	40	67.0	0.80	Altoona	95	46	73.0	5.36	
Fort Bayard	93	53	72.2	0.20	Beaver	91	49	69.0	6.95	
Fort Selden	100	50	80.3	2.30	Bethlehem	95	45	74.0	9.20	
Fort Union	91	46	.....	8.28	Bernice	90	37	65.1	6.21
Fort Wingate	89	40	.....	0.24	Catawissa	98	46	70.0	6.28
Gallinas Spring	94	53	73.1	3.32	Charleeville	93	38	67.2	7.05	
Las Vegas	94	50	69.5	6.10	Chambersburg	96	43	71.0	5.45	
<i>New York.</i>					<td>Coatsville</td> <td>96</td> <td>43</td> <td>71.0</td> <td>5.45</td>	Coatsville	96	43	71.0	5.45
Ardenia	91	55	72.0	7.21	Corry *	90	33	66.4	3.15	
Auburn	85	45	67.1	3.73	Drifton	94	43	66.4	11.27	
Boyd's Corners	93	55	71.6	6.87	Dyberry	89	38	63.9	7.40	
Brooklyn	94	53	72.2	7.66	Eagle's Mere	85	42	66.5	9.25	
Carmel	92	43	69.6	6.49	Emporium	93	40	72.2	4.28	
Cooperstown	90	48	66.0	4.95	Franklin *	92	.....	65.4	5.52
Eden	81	44	.....	4.44	Germantown	94	52	.....	5.30
Factoryville	91	40	67.2	3.44	Girardville	91	47	70.3	6.58	
Fort Columbus	93	52	.....	6.67	Grampian Hills	90	40	67.0	8.19
Fort Niagara	90	49	.....	6.22	Greenville	90	38	67.0	3.18
Geneva	.....	.....	67.2	3.04	Hamilton	77	52	65.8	.....
Humphrey	90	43	66.2	3.09	Harrisburg	95	51	71.4	5.54	
Ithaca	92	46	68.2	3.46	Holidaysburgh	96	39	69.0	7.26	
Lyons	90	49	66.7	2.91	Honesdale	86	39	65.0	5.59	
Madison Barracks	89	42	.....	6.49	Indiana	91	40	68.8	10.00
Middleburg	90	37	.....	3.40	Johnstown	96	45	68.5	8.34
Palmyra	92	52	69.7	.....	Kutztown	95	42	69.7	10.95
Penn Yan	.....	.....	.....	4.80	Lebanon	90	43	70.8	7.73
Plattsburg B'ks	91	40	.....	5.23	Lock Haven	100	44	70.8	7.32
Rose	91	54	69.0	4.91	Meadville	88	.....	.....	4.79
Savona	93	40	66.0	3.02	McConnellsburg	95	42	69.4	8.61	
Setauket	90	54	71.0	5.60	Montrose	95	44	71.5	7.89	
Utica	101	39	64.3	3.80	New Bloomfield	98	42	68.6	7.03	
West Point	94	47	.....	6.40	New Castle	93	40	70.3	6.38
White Plains	84	57	71.8	6.42	Phillipsburg	93	33	64.8	7.19	
<i>North Carolina.</i>					Pottstown	97	50	74.3	6.13	
Lenoir	93	52	.....	3.80	Quakertown	95	42	69.9	8.58
Mount Pleasant	97	48	76.2	6.18	Reading	97	39	71.9	6.65	
Monroe	97	52	77.7	4.08	Rimersburg	92	46	70.4	.....
Salisbury	96	62	79.0	4.26	Selins Grove	97	50	74.5	10.12	
Statesville *	94	55	76.1	5.38	Shamokin	97	43	70.0	6.58	
Tarborough	100	54	79.5	2.85	Smithport	89	38	65.4	6.78	
Weldon *	101	50	79.0	1.82	Somersett	92	33	64.5	7.68	
<i>Ohio.</i>					State College	92	43	69.9	6.16	
Akron	89	45	68.5	6.05	Swarthmore	94	48	72.5	6.75	
Ashland	.....	.....	.....	2.87	Tionesta	90	42	64.8	4.40
Athens	90	47	70.9	5.40	Troy	95	45	64.9	.....
Bangorville	94	44	67.7	5.79	Uniontown	94	43	71.2	10.23	
Bellevue	94	53	.....	3.51	Wellsborough	92	34	65.5	5.76
Canton	.....	.....	.....	4.45	West Chester	94	49	72.6	3.90
Celina	93	45	70.7	2.25	Westtown	93	48	70.2	1.34	
Circleville	.....	.....	.....	6.97	Wysox	92	41	68.0	6.13
Clarksville	93	48	70.6	10.13	York	98	47	73.7	5.62	
Cleveland	94	46	69.6	2.10	<i>Rhode Island.</i>					
College Hills	100	53	76.9	9.00	Bristol	84	54	66.6	5.26	
Collinwood	89	46	68.1	3.88	Newport	83	56	68.4	.....
Dayton	99	44	72.9	5.53	Olneyville	92	44	72.0	.....
Demos	89	49	70.8	7.10	Providence a	92	51	70.3	7.84	
Elyria	97	40	71.8	1.31	Providence b	.....	.....	.....	7.18
Garrettsville	90	38	65.4	3.70	Woonsocket	91	50	69.5	5.73	
Georgetown	98	48	72.9	8.49	<i>South Carolina.</i>					
Gracey	.....	.....	.....	8.55	Abbeville	100	63	80.5	4.80

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>N. Carolina—Cont'd.</i>					<i>Texas—Continued.</i>				
Allendale.....	98	57	77.5	3.10	Fort McIntosh.....	104	70	86.8	3.87
Batesburg.....	100	55	77.5	4.65	Fort Ringgold.....	108	68	86.5	1.45
Blackville.....	97	54	75.5	6.70	Gallinas.....	102	64	81.3	9.40
Branchville.....	97	54	75.5	4.10	Granbury.....	102	69	80.5	15.67
Brewer's Mine.....	100	50	75.0	3.80	Lampasas.....	100	64	80.1	3.86
Cedar Springs.....	101	50	75.5	5.38	Mesquite.....	106	65	80.5	7.79
Camden.....	90	55	72.5	3.00	Mexia.....	96	65	80.5	2.69
Cheraw.....	100	53	76.5	4.19	New Uim.....	87	74	80.6	4.34
Chester.....	100	54	77.0	3.04	Paris.....	103	64	81.8	2.37
Clinton.....	102	65	78.5	4.19	Silver Falls.....	100	58	74.8	4.29
Conway.....	98	54	76.0	3.58	<i>Vermont.</i>				
Evergreen.....	96	50	73.0	3.53	Brattleborough a.....	93	45	69.0	7.13
Florence.....	100	56	78.0	3.08	Brattleborough b.....	93	40	66.7	4.82
Georgetown.....	100	54	77.0	3.11	Burlington.....	99	53	76.0	4.10
Greenwood.....	100	50	75.0	3.47	Chelsea.....	77	45	60.9	3.78
Hardeeville.....	100	50	75.0	3.68	Jacksonville.....	99	38	63.0	0.30
Jacksonborough.....	98	54	76.0	4.80	Lunenburg.....	85	48	67.6	6.58
Kingstree.....	99	54	76.5	1.52	Manchester.....	85	53	67.5	5.91
Kirkwood.....	90	55	72.5	2.00	Middlebury.....	84	53	78.1	3.10
Marion.....	96	54	74.0	5.37	Northfield.....	85	41	64.0	3.43
Newberry.....	99	58	78.4	4.69	Saint Johnsbury.....	80	44	62.0	4.07
Saint Matthews.....	100	61	80.5	5.48	Stratford.....	84	50	66.4	4.70
Spartanburg.....	100	58	78.0	5.75	Vernon.....	90	50	67.8	0.88
Stateburg.....	91	59	75.0	4.22	<i>Virginia.</i>				
Timmonsville.....	95	59	77.0	4.22	Birdsnest.....	94	57	77.4	3.95
Union.....	97	60	78.5	3.70	Christiansburg.....	96	44	70.0	2.02
Wainsborough.....	97	60	78.4	5.70	Dale Enterprise.....	98	47	77.5	7.08
Williamstown.....	95	61	78.5	6.56	Fort Monroe.....	96	45	69.5	3.08
Windsor.....	95	56	75.5	6.90	Marion.....	94	45	69.5	5.56
Yorkville.....	98	54	76.0	5.74	Petersburg.....	97	65	80.3	5.45
<i>Tennessee.</i>					Summit.....	95	45	73.4	3.86
Andersonville.....	95	54	74.5	5.02	University of Va.....	95	43	79.5	3.86
Ashwood.....	95	62	78.5	11.93	Variety Mills.....	96	50	73.0	3.50
Austin.....	100	62	79.4	6.85	Wytheville.....	92	58	74.3	3.07
Covington.....	96	67	77.5	9.86	<i>Washington Territory.</i>				
Fayetteville.....	97	60	77.0	3.36	Blakely.....	88	46	62.2	0.34
Florence Station.....	94	63	77.8	8.97	Fort Spokane.....	105	43	73.0	0.43
Fostoria.....	98	60	77.3	6.30	Fort Townsend.....	84	46	62.5	0.43
Greenville.....	93	56	73.2	4.24	Fort Walla Walla.....	104	50	78.6	0.63
Hohenwald.....	104	53	74.0	10.87	Tacoma.....	83	55	66.3	0.63
Jacksonborough.....	98	50	74.4	6.44	Vashon.....	89	33	65.3	0.30
Kingston Springs.....	96	55	77.5	5.78	<i>West Virginia.</i>				
Lewisburg.....	95	64	79.9	7.72	Hartmonsville.....	88	48	67.0	0.47
Maryville.....	95	62	73.0	3.73	Holvetia.....	93	40	67.8	4.67
Milan.....	99	58	77.0	10.00	Middlebrook.....	86	40	64.7	5.76
Nunnally.....	96	58	77.0	8.03	Parkersburg.....	90	48	70.6	5.76
Parksville.....	97	58	76.6	4.37	Rockport.....	90	48	70.6	5.76
Riddleton.....	96	56	75.4	8.05	White Sulph. Sp'gs.....	90	48	70.6	5.76
Rogersville.....	96	61	79.4	5.32	<i>Wisconsin.</i>				
Trenton.....	94	56	75.5	8.62	Beloit.....	91	46	67.6	3.34
Watkins.....	102	69	78.0	6.02	Deuster.....	97	40	66.4	4.40
Waynesborough.....	98	58	74.8	9.15	Embarass.....	87	43	66.6	4.35
Woodstock.....	99	66	81.1	8.80	Fond du Lac.....	87	39	65.4	2.30
<i>Texas.</i>					Fredonia.....	92	45	66.4	2.30
Austin.....	99	66	84.2	6.38	Lancaster.....	98	42	69.2	1.60
Cedar Hill.....	101	65	83.0	7.00	Madison.....	91	50	67.4	1.27
Cleburne.....	95	64	79.1	8.40	Manitowoc.....	90	42	65.5	2.70
Colorado City.....	107	62	84.5	4.30	<i>Wyoming.</i>				
Comanche.....	105	65	83.7	1.75	Camp Sheridan.....	90	38	59.3	1.31
Corralcane.....	100	60	80.0	3.92	Fort Laramie.....	100	43	65.5	3.06
Deatur.....	101	62	79.7	8.73	Fort McKinney.....	87	42	65.5	3.06
Fort Concho.....	111	61	86.0	2.58	Fort Washakie.....	89	39	65.5	2.06

Rainfall (in inches and hundredths) at North Lewisburg, Champaign Co., Ohio, from 1852 to 1888, inclusive, as furnished by Mr. H. D. Govey.

Total for 1852, 58.84; 1853, 45.20; 1854, 41.35; 1855, 52.47; 1856, 30.87; 1857, 39.77; 1858, 40.99; 1859, 36.57; 1860, 35.72; 1861, 36.35; 1862, 32.19; 1863, 46.04; 1864, 35.72; 1865, 37.79; 1866, 49.62; 1867, 31.86; 1868, 46.31; 1869, 42.71; 1870, 32.30; 1871, 30.64.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1852.....	0.70	0.35	0.90	1.35	3.25	1.75	5.75	4.55	6.75	2.20	0.40	2.10	23.05
1853.....	2.70	2.45	1.90	3.25	2.85	2.80	2.00	2.00	3.10	3.15	1.80	5.45	38.65
1854.....	3.10	3.95	4.20	4.70	1.90	3.50	1.60	2.40	1.75	0.50	2.10	2.40	32.10
1855.....	1.00	0.75	1.90	0.80	4.60	0.65	7.40	3.80	3.95	2.20	3.90	2.90	38.81
1856.....	8.67	2.13	2.00	2.70	2.60	2.90	8.60	1.80	4.60	2.85	2.25	2.40	43.55
1857.....	0.44	0.62	5.87	2.41	2.44	10.60	2.75	1.61	1.27	1.50	4.02	1.86	35.39
1858.....	3.02	1.70	3.29	3.82	3.31	5.25	5.83	3.90	3.15	2.75	1.75	3.30	41.07
1859.....	0.75	5.70	4.40	0.63	1.55	4.50	4.95	5.55	4.55	0.63	5.35	3.55	48.11
1860.....	5.50	5.10	3.70	6.45	2.70	3.35	4.05	5.30	2.65	1.10	3.05	2.90	46.05
1861.....	2.55	4.35	5.35	1.65	2.90	3.15	4.85	1.70	3.10	5.45	4.00	4.60	43.65
1862.....	4.85	4.35	4.05	2.75	7.05	4.40	3.44	7.55	2.76	1.60	1.55	1.50	45.75
1863.....	2.35	5.20	2.55	3.80	6.05	6.20	3.90	1.90	2.65	5.00	4.40	3.30	48.80
1864.....	1.90	4.55	3.10	1.75	2.05	1.90	4.35	0.80	7.60	1.05	0.85	4.40	34.30
1865.....	4.60	1.80	0.80	3.90	5.00	3.70	2.45	7.55	3.15	2.20	2.25	1.55	38.90
1866.....	4.30	1.55	2.60	2.25	7.55	1.05	4.65	4.35	2.10	1.80	4.20	3.45	44.05
1867.....	3.05	5.60	3.20	3.70	4.35	2.70	3.20	3.00	3.05	0.45	3.25	2.50	35.05
1868.....	0.15	1.70	5.90	2.50	4.50	2.45	4.15	0.05	1.25	.....	.....	.....	40.02
Mean.....	3.63	3.23	3.20	2.85	3.81	3.93	4.47	3.75	3.15	2.15	2.82	3.01	40.02

Rainfall (in inches and hundredths) observed at Harvard College Observatory, Cambridge, Mass.

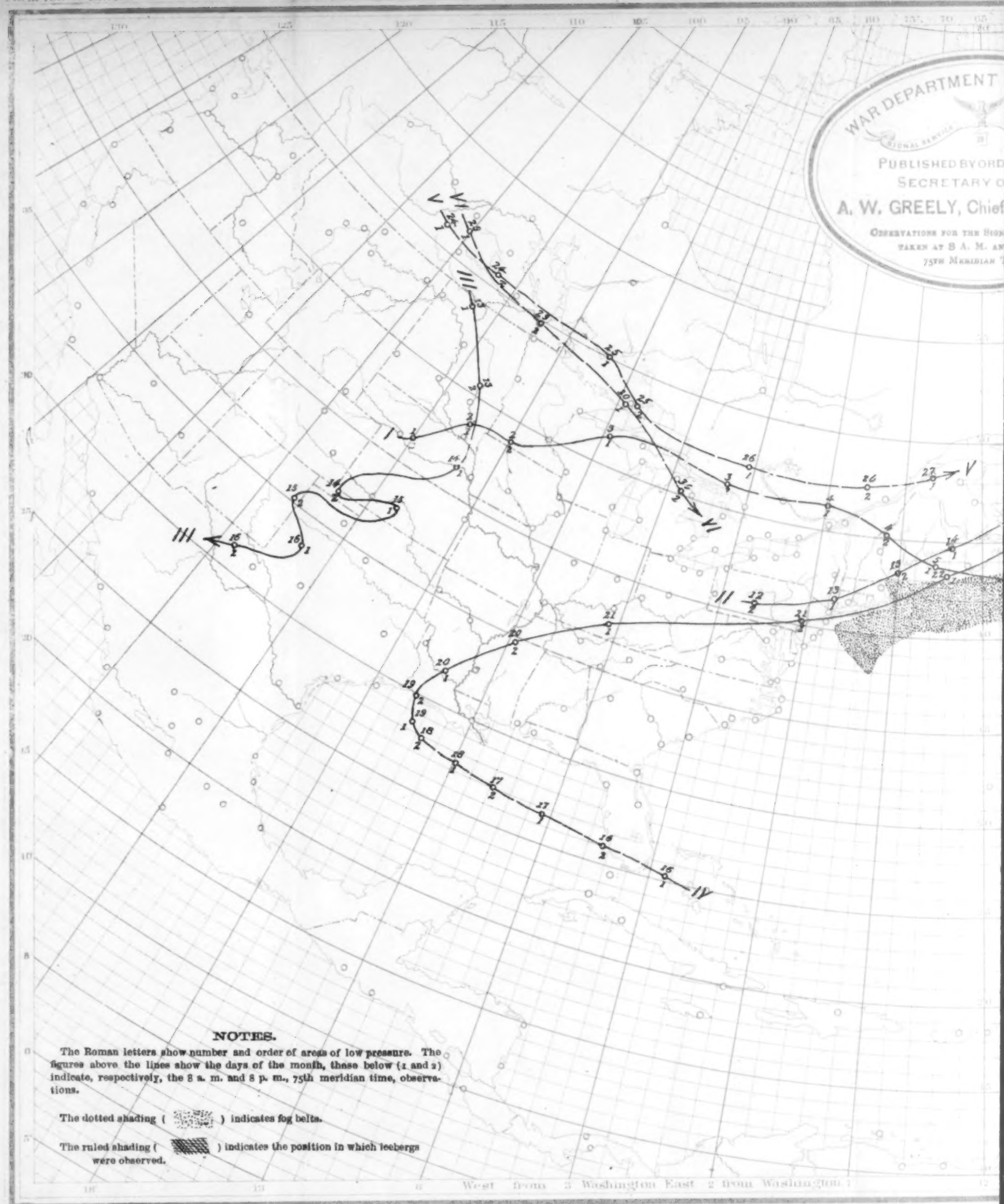
1840...	4.07	3.09	3.77	3.68	2.30	2.51	4.39	2.48	2.89	3.66	9.30	1.91	44.05
1841...	4.90	1.81	2.74	4.71	1.98	0.66	3.02	6.15	3.27	3.72	2.76	5.14	40.86
1842...	0.78	3.18	2.75	3.35	2.33	5.84	1.42	5.60	3.34	1.26	4.14	6.64	40.65
1843...	2.26	6.56	5.83	4.12	2.17	5.36	2.48	8.80	1.52	5.81	4.26	3.34	52.52
1844...	4.45	3.03	5.84	0.34	1.96	1.77	2.90	3.35	4.50	3.37	1.50	1.22	33.17
1845...	3.93	3.78	3.67	1.48	2.63	3.15	4.07	2.53	2.58	4.22	10.43	8.04	50.51
1846...	2.60	1.50	1.56	1.50	3.59	2.68	3.19	2.38	2.01	1.63	2.55	5.19	30.37
1847...	3.67	3.34	5.91	2.83	1.94	5.49	2.53	5.22	6.54	1.44	4.94	4.37	48.21
1848...	2.89	4.00	2.50	1.20	7.68	2.81	2.58	3.50	5.18	6.31	1.16	3.23	43.03
1849...	0.72	1.46	6.90	1.18	2.76	1.37	1.17	6.52	2.13	7.56	5.43	3.78	40.97
1850...	3.86	2.51	3.27	4.79	7.22	2.97	2.62	7.64	9.82	2.51	3.59	3.34	54.14
1851...	1.03	4.22	2.01	9.10	3.93	1.62	3.21	1.40	3.97	4.07	4.96	2.00	42.11
1852...	2.22	0.62	2.10	7.94	2.30	4.03	1.86	7.50	2.01	2.92	3.83	3.17	40.51
1853...	3.88	5.70	3.31	3.70	6.46	0.96	3.02	8.59	5.95	3.49	4.91	4.29	53.83
1854...	1.86	3.97	2.93	4.84	5.43	3.58	3.24	0.35	4.30	2.11	7.98	4.46	45.17
1855...	7.26	3.74	1.16	3.99	1.90	3.58	4.84	2.27	1.22	5.57	5.33	7.19	47.65
1856...	5.30	0.57	0.97	3.44	6.74	2.87	4.24	14.95	4.66	3.24	2.89	3.90	53.81
1857...	7.57	3.72	3.50	8.95	5.17	1.71	6.33	6.67	3.94	3.69	2.95	4.83	57.93
1858...	3.44	1.86	1.77	3.81	3.71	7.55	4.36	5.57	5.11	2.87	2.38	3.04	45.46
1859...	8.23	6.45	8.44	2.36	2.98	6.81	1.50	5.39	5.37	3.12	3.68	4.99	59.34
1860...	1.00	2.21	1.73	1.32	0.93	7.41	5.19	5.24	9.33	1.86	4.12	4.75	45.09
1861...	8.93	2.79	6.36	6.02	3.19	2.56	3.39	5.57	1.77	2.68	3.31	3.31	50.28
1862...	7.70	2.79	6.31	4.73	2.38	6.29	5.05	6.29	4.66	5.24	6.73	2.20	57.21
1863...	4.43	1.63	2.46	7.39	1.67	2.47	12.43	5.57	2.95	3.40	6.54	5.45	56.42
1864...	3.34	0.89	5.39	7.81	2.91	0.78	1.20	2.55	1.68	4.60	3.52	4.59	39.46
1865...	4.87	4.31	4.25	2.88	6.24	2.20	3.67	1.76	1.00	5.71	3.68	3.02	43.59
1866...	4.07	3.60	3.60	1.66	3.92	2.74	3.32	1.73	5.71	0.95	2.65	1.83	35.52
1867...	4.36	4.10	4.22	3.08	2.96	1.75	5.45	7.95	0.50	5.02	1.84	1.48	41.71
Mean...	4.07	3.09	3.77	3.86	3.53	3.33	3.67	5.13	3.82	3.66	4.31	3.95	46.19

Table of miscellaneous meteorological data for August, 1888—Signal Service observations.

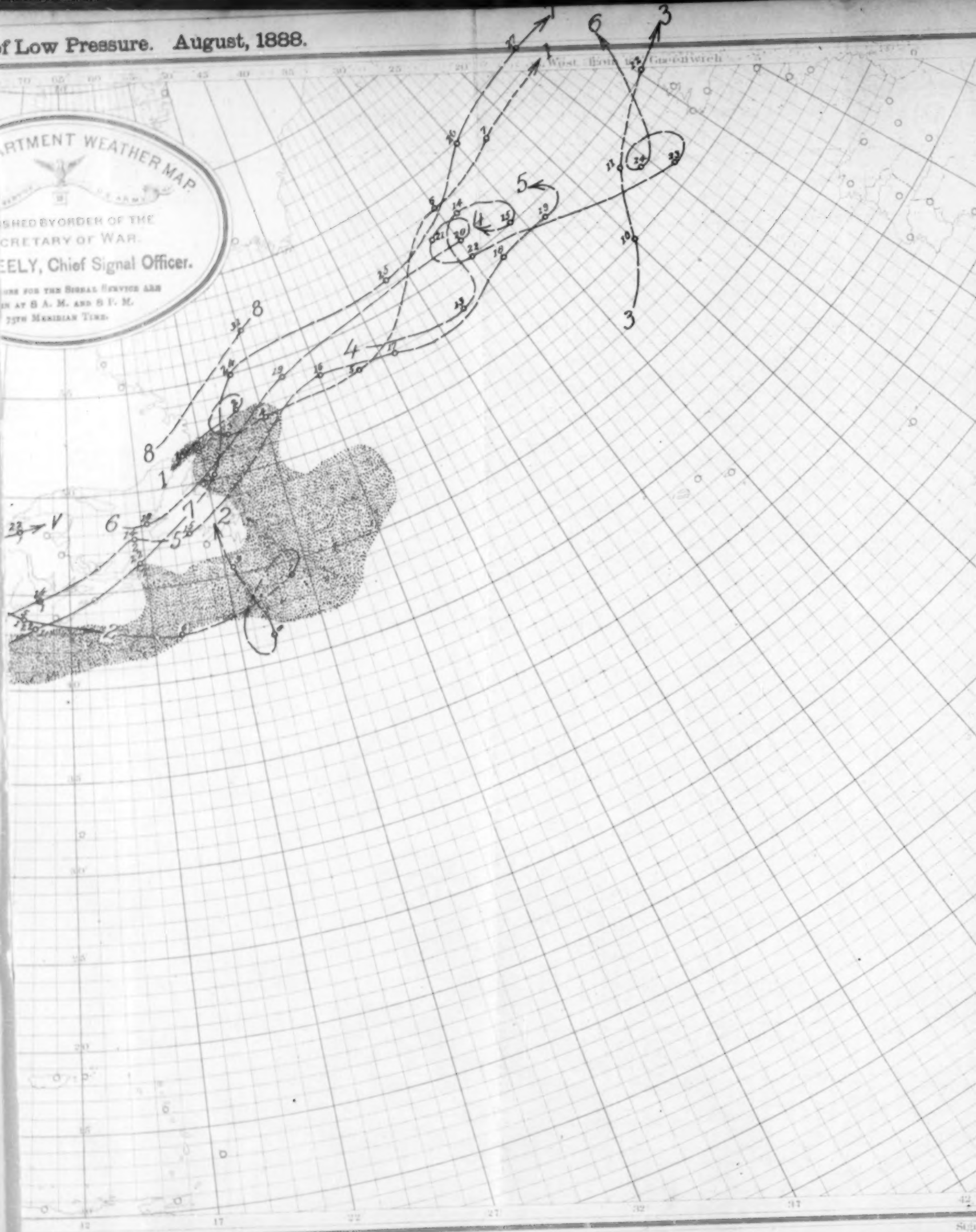
Stations and districts.	Elevation above level, feet.	Atmospheric pressure, in inches and hundredths.					Temperature of the air, in degrees Fahrenheit.										Precipitation, in inches.		Winds.																
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.		Monthly range of barometer.	Monthly mean.	Departure from normal.	Extremes.				Daily ranges.		Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.	Departure from normal precipitation, in inches.	Total movement, miles.	Prevailing direction.	Maximum velocity.		No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.								
					Highest barometer.	Date.				Lowest barometer.	Date.	Max.	Date.	Mean max.	Min.							Date.	Mean min.					Monthly range.	Greatest.	Least.					
																															Date.	Date.	Date.	Date.	Date.
<i>New England.</i>																																			
Eastport	53	29.84	-0.07	29.90	30.27	11	29.49	22	0.78	66.2	1.6	79.0	18	66.9	47.2	26	51.6	31.8	27.0	18	4.2	13	84.2	52.9	4.30	+1.21	4,864	sw.	48	ne.	22	14	15	7	9
Portland	99	29.81	-0.06	29.91	30.28	11	29.49	22	0.78	66.4	1.6	79.0	18	67.0	48.5	23	57.5	36.7	27.5	24	3.6	7.7	7.6	37.1	4.30	-0.61	5,654	sw.	30	nw.	22	13	11	9	11
Manchester	247	29.69	-0.09	29.95	30.33	11	29.56	23	0.78	66.3	1.7	90.8	5	77.4	47.5	11	57.6	43.3	32.4	3	4.3	12	72.8	37.0	4.20	-0.69	3,698	nw.	24	nw.	14	10	7	12	12
Mt. Washington	6,279	23.82	-0.08	29.93	30.31	11	29.58	23	0.78	44.4	-1.6	63.4	5	58.2	50.2	26	39.6	34.4	16.4	24	3.5	17	89.0	41.0	15.31	+7.35	39,345	w.	170	nw.	23	24	23	5	3
Northfield	871	29.01	-0.09	29.93	30.31	11	29.60	23	0.71	63.0	-0.0	85.0	4	73.2	41.0	21	54.9	44.4	33.2	21	5.0	12	85.0	58.6	3.43	-0.09	6,033	sw.	31	nw.	22	13	7	9	5
Boston	125	29.83	-0.04	29.95	30.32	11	29.57	22	0.75	69.0	-1.0	88.2	5	78.8	52.3	23	61.4	36.4	21.0	30	5.0	6.7	79.0	58.6	6.53	+2.09	8,435	sw.	45	e.	22	11	8	13	1
Nantucket	14	29.95	-0.06	29.95	30.28	11	29.55	23	0.73	66.2	-1.7	81.9	4	75.3	50.7	12	61.1	24.0	19.3	3	8.0	26	87.6	62.3	0.87	-0.09	7,218	sw.	36	sw.	13	7	10	9	1
Wood's Holl	22	29.86	-0.08	29.88	30.17	11	29.50	23	0.68	66.2	-1.6	79.0	4	73.0	50.2	23	63.3	33.6	16.5	18	5.0	27	85.2	61.4	1.36	-3.04	10,894	sw.	48	sw.	22	10	7	9	1
Vineyard Haven	36	29.95	-0.03	29.95	30.29	11	29.62	23	0.67	71.4	-0.7	87.0	18	65.0	56.1	18	63.8	30.9	30.0	2	8.0	6	86.0	63.0	1.02	-0.09	10,993	sw.	48	sw.	22	9	8	10	13
Block Island	26	29.95	-0.03	29.95	30.29	11	29.62	23	0.67	71.4	-0.7	87.0	18	65.0	56.1	18	63.8	30.9	30.0	2	8.0	6	86.0	63.0	1.02	-0.09	10,993	sw.	48	sw.	22	9	8	10	13
Narragansett Pier	22	29.95	-0.03	29.95	30.29	11	29.62	23	0.67	71.4	-0.7	87.0	18	65.0	56.1	18	63.8	30.9	30.0	2	8.0	6	86.0	63.0	1.02	-0.09	10,993	sw.	48	sw.	22	9	8	10	13
New Haven	107	29.86	-0.04	29.97	30.30	11	29.49	21	0.81	68.9	+0.2	90.8	16	78.8	47.8	23	60.8	38.0	26.0	29	7.0	37	79.0	63.0	7.10	+1.44	4,819	sw.	43	ne.	21	11	8	10	13
New London	47	29.91	-0.06	29.96	30.26	11	29.60	22	0.66	70.0	+0.1	88.0	16	77.3	54.0	28	63.5	34.0	20.7	14	4.7	8	78.9	62.9	3.81	+1.40	3,933	sw.	45	ne.	21	9	5	20	6
<i>Mid. Atlantic States.</i>																																			
Albany	85	29.87	-0.04	29.96	30.32	11	29.63	22	0.69	69.8	-1.2	90.0	16	81.0	49.3	23	61.5	41.0	28.0	2	6.0	6	77.0	61.8	4.74	+1.18	3,918	sw.	30	w.	27	13	12	8	10
New York City	135	29.89	-0.03	29.99	30.33	11	29.63	22	0.69	71.6	-0.6	96.6	16	84.2	53.0	23	73.5	25.6	13.6	30	6.0	13	84.4	72.2	2.31	-0.26	7,833	sw.	48	w.	13	9	3	24	4
Philadelphia	117	29.89	-0.01	30.01	30.31	11	29.42	21	0.88	73.6	+0.6	97.8	8	84.9	54.0	23	66.7	43.8	23.0	28	7.5	18	69.0	69.6	5.86	+1.57	6,747	sw.	37	w.	8	13	8	10	13
Atlantic City	34	29.96	-0.01	30.01	30.28	11	29.48	21	0.88	71.6	-0.4	87.8	8	79.1	51.3	23	65.7	34.4	21.0	25	7.0	19	80.7	65.4	4.30	-0.50	6,131	sw.	39	sw.	21	10	6	13	12
Baltimore	45	29.97	-0.01	30.01	30.28	11	29.44	21	0.84	75.2	+1.2	95.8	16	84.9	53.0	23	67.5	45.0	34.4	126	7.9	18	69.0	64.1	6.17	+1.72	3,660	sw.	45	sw.	8	12	7	12	12
Washington City	100	29.91	-0.01	30.03	30.28	11	29.40	21	0.83	73.9	-0.1	97.2	8	85.5	51.5	29	66.2	24.5	7.0	26	11.9	21	79.6	67.1	3.35	+1.72	2,896	sw.	36	sw.	8	13	9	4	18
Cape Henry	68	29.36	+0.01	30.05	30.29	11	29.58	21	0.71	78.8	-0.8	98.5	7	87.6	57.2	24	60.6	41.8	29.8	31	7.6	10	86.0	71.8	2.54	+3.28	2,500	sw.	38	sw.	22	12	12	7	9
Lynchburg	69	29.96	-0.03	30.03	30.22	11	29.61	21	0.61	76.0	-0.0	98.4	8	82.1	56.0	24	60.9	42.4	26.4	25	5.9	10	76.2	67.7	7.81	+1.72	4,261	sw.	38	sw.	21	13	4	18	9
Norfolk	69	29.96	-0.03	30.03	30.22	11	29.61	21	0.61	76.0	-0.0	98.4	8	82.1	56.0	24	60.9	42.4	26.4	25	5.9	10	76.2	67.7	7.81	+1.72	4,261	sw.	38	sw.	21	13	4	18	9
Harrisburg	361	29.93	-0.03	30.00	30.27	11	29.46	21	0.81	71.4	-0.7	95.0	8	82.1	51.5	29	63.7	44.0	29.5	30	7.5	18	75.8	63.0	6.28	-0.09	4,074	sw.	28	n.	8	12	10	10	11
<i>S. Atlantic States.</i>																																			
Charleston	808	29.25	-0.08	30.08	30.26	24	29.84	21	0.42	75.7	-0.7	100.0	7	90.0	55.4	24	68.1	44.6	29.2	12	8.8	21	76.2	67.1	6.93	-2.02	2,947	sw.	30	sw.	23	13	12	8	11
Hatteras	11	30.09	+0.08	30.11	30.27	24	29.87	21	0.40	75.7	+0.4	87.8	9	82.3	62.2	24	73.5	25.6	13.6	30	6.0	13	84.4	72.2	2.31	-0.26	7,833	sw.	48	sw.	23	13	12	8	11
Kitty Hawk	375	29.67	-0.08	30.06	30.23	11	29.76	21	0.49	75.7	-0.7	100.0	7	90.0	55.4	24	68.1	44.6	29.2	12	8.8	21	76.2	67.1	6.93	-2.02	2,947	sw.	30	sw.	23	13	12	8	11
Raleigh	375	29.67	-0.08	30.06	30.23	11	29.76	21	0.49	75.7	-0.7	100.0	7	90.0	55.4	24	68.1	44.6	29.2	12	8.8	21	76.2	67.1	6.93	-2.02	2,947	sw.	30	sw.	23	13	12	8	11
Southport	52	30.02	+0.05	30.08	30.24	16	29.93	5	0.38	79.6	-1.1	95.2	7	86.4	58.8	24	74.9	39.5	21.4	13	5.8	29	82.0	73.6	4.01	-3.21	4,135	sw.	28	sw.	21	13	9	11	11
Wilmington	52	30.03	+0.06	30.08	30.24	16	29.93	5	0.38	79.6	-1.1	95.2	7	86.4	58.8	24	74.9	39.5	21.4	13	5.8	29	82.0	73.6	4.01	-3.21	4,135	sw.	28	sw.	21	13	9	11	11
Charleston	52	30.03	+0.06	30.08	30.24	16	29.93	5	0.38	79.6	-1.1	95.2	7	86.4	58.8	24	74.9	39.5	21.4	13	5.8	29	82.0	73.6	4.01	-3.21	4,135	sw.	28	sw.	21	13	9	11	11
Columbia	185	29.98	-0.06	30.09	30.27	24	29.92	5	0.35	79.6	-0.8	98.5	7	87.6	57.2	24	60.6	41.8	29.8	31	7.6	10	86.0	71.8	2.54	+3.28	2,500	sw.	38	sw.	22	12	12	7	9
Augusta	87	29.98	-0.06	30.09	30.27	24	29.92	5	0.35	79.6	-0.8	98.5	7	87.6	57.2	24	60.6	41.8	29.8	31	7.6	10	86.0	71.8	2.54	+3.28	2,500	sw.	38	sw.	22	12	12	7	9
Savannah	43	29.98	-0.06	30.09	30.27	24	29.92	5	0.35	79.6	-0.8	98.5	7	87.6	57.2	24	60.6	41.8	29.8	31	7.6	10	86.0	71.8	2.54	+3.28	2,500	sw.	38	sw.	22	12	12	7	9

Table of miscellaneous meteorological data for August, 1888—Signal Service observations—Continued.

Stations and districts.	Elevation above level, feet.	Atmospheric pressure, in inches and hundredths.				Temperature of the air, in degrees Fahrenheit.										Winds.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes. Highest barometer. Date.	Extremes. Lowest barometer. Date.	Monthly range of barometer.	Monthly mean.	Departure from normal.	Extremes.				Daily ranges.		Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.	Departure from normal precipitation, in inches.	Total movement, miles.	Prevailing direction.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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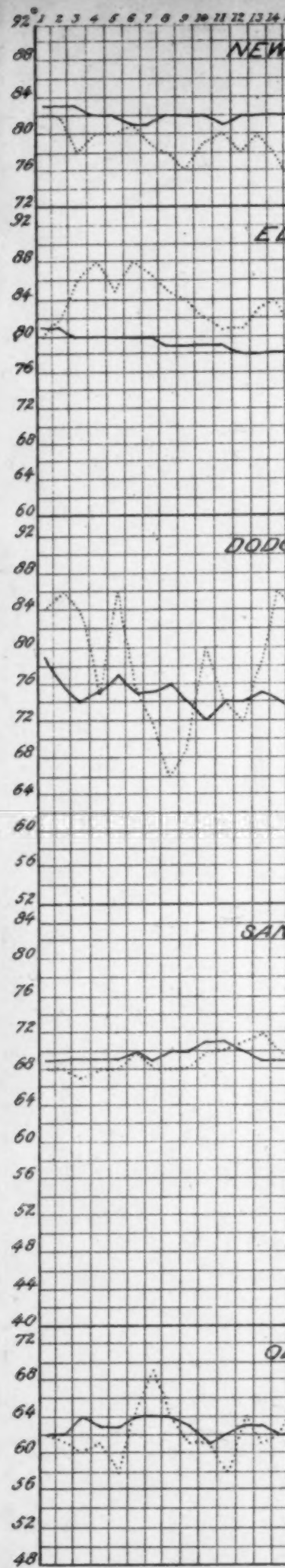
of Low Pressure. August, 1888.



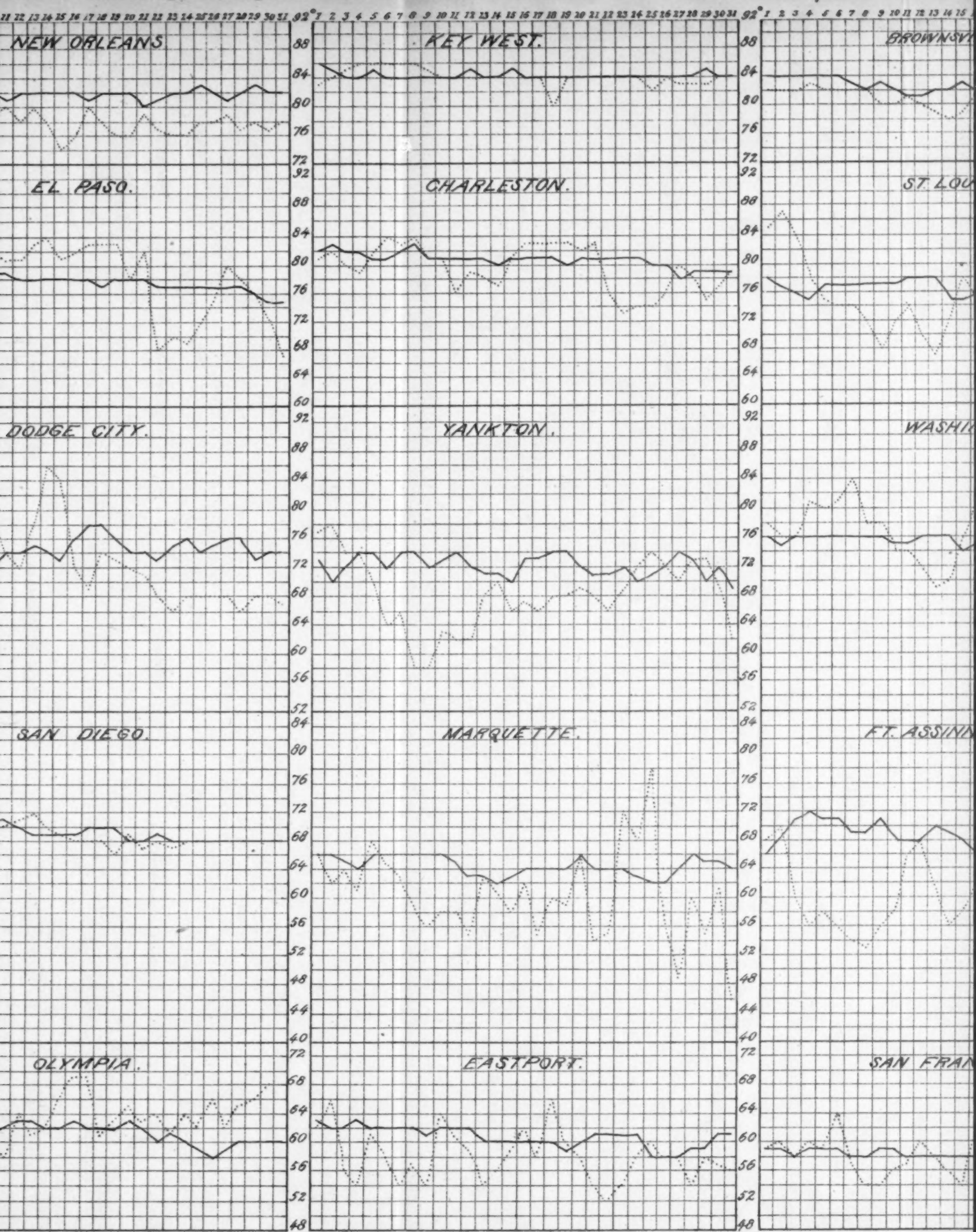


Signal Office Lith.

Chart III.



III. Normal August temperatures for a number of years (——). Mean temperatures for August



es for August, 1888 (.....).

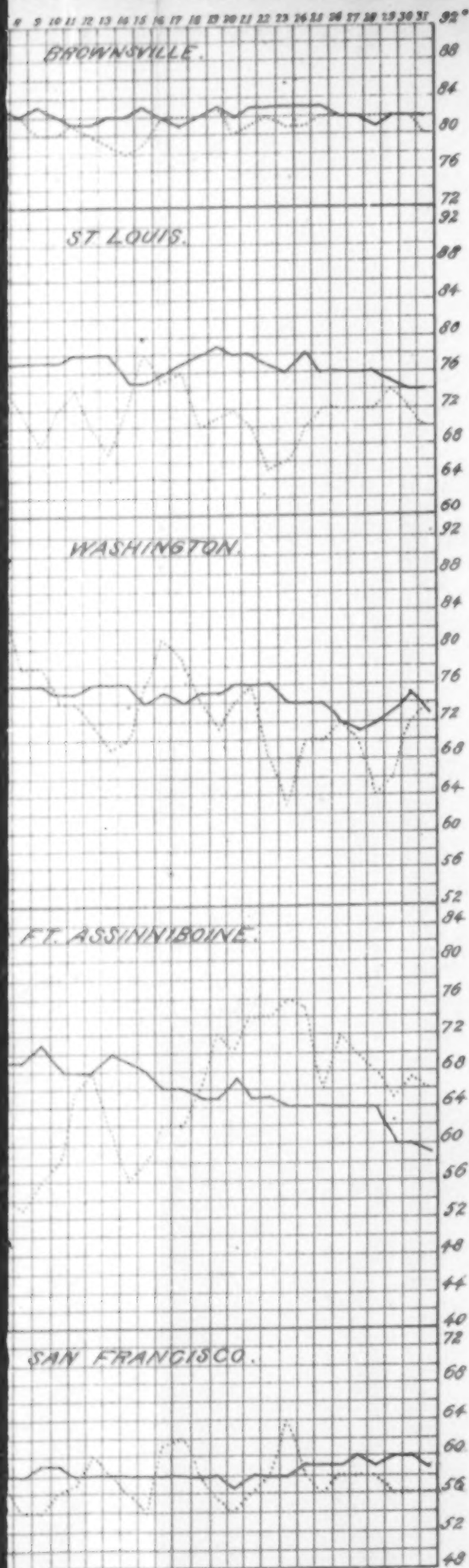


Chart II. Isobars, Isotherms, and Winds. August, 1888

Form 104: F.



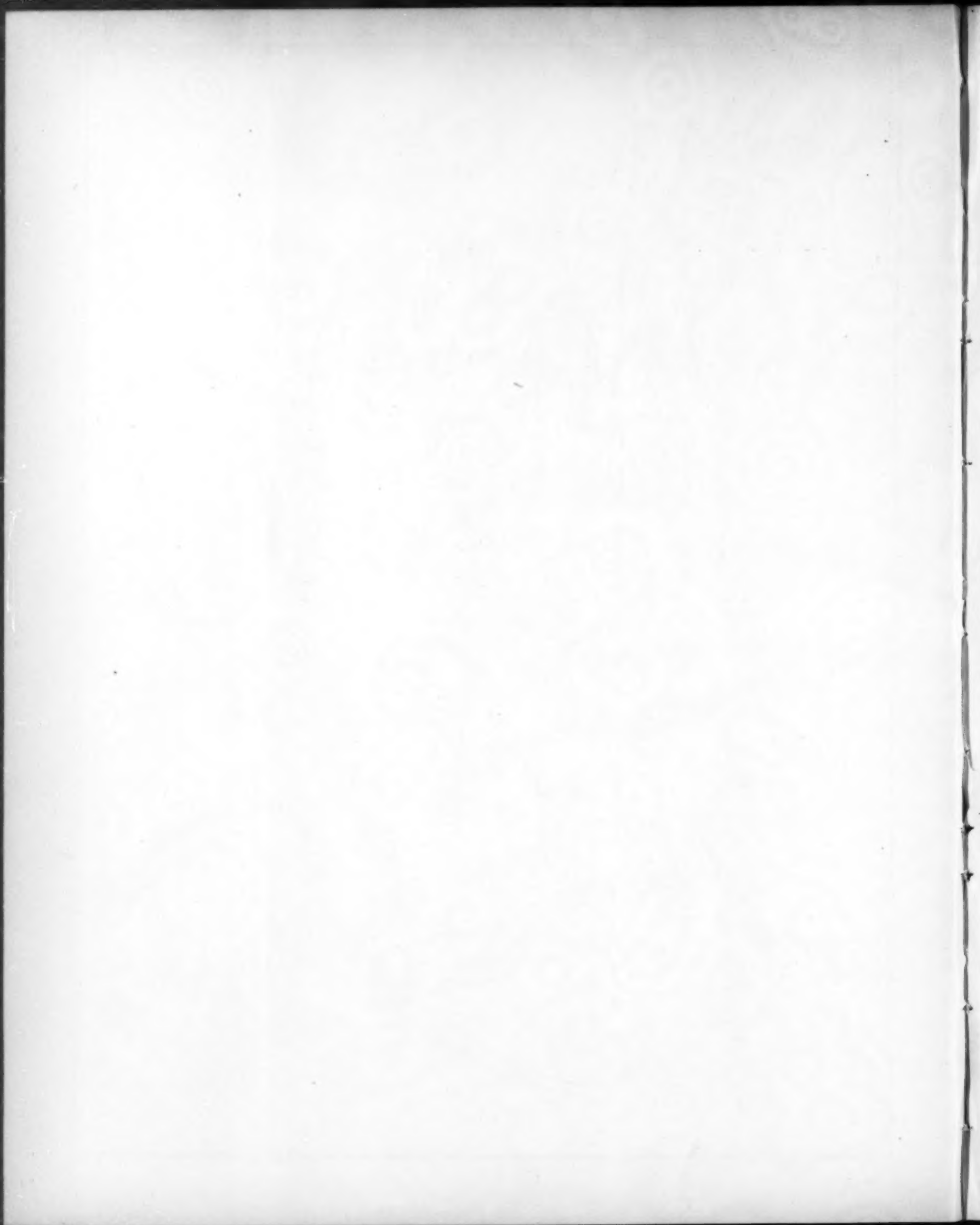


Chart IV. Precipitation, August, 1888.

From 1888 F.

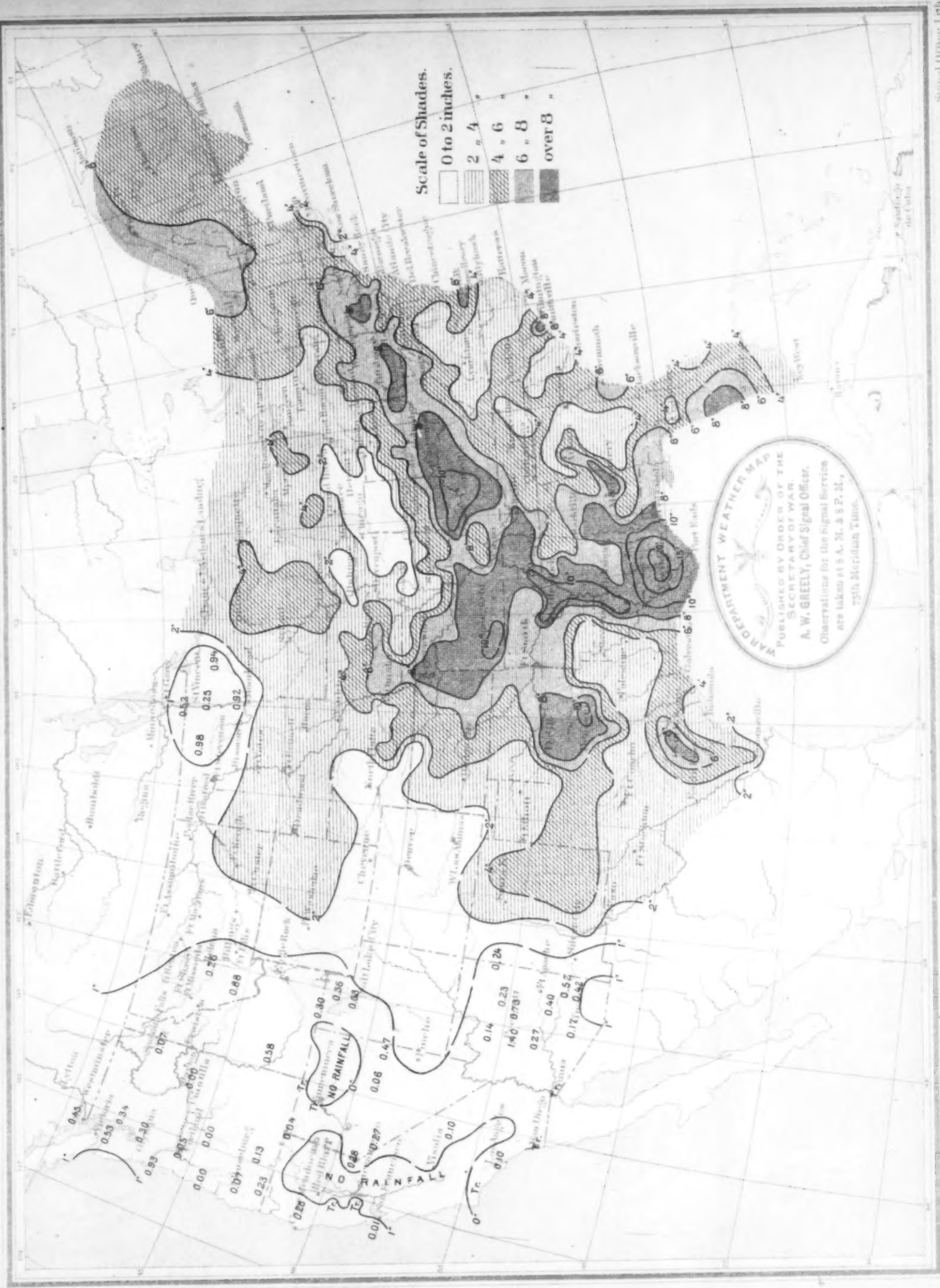
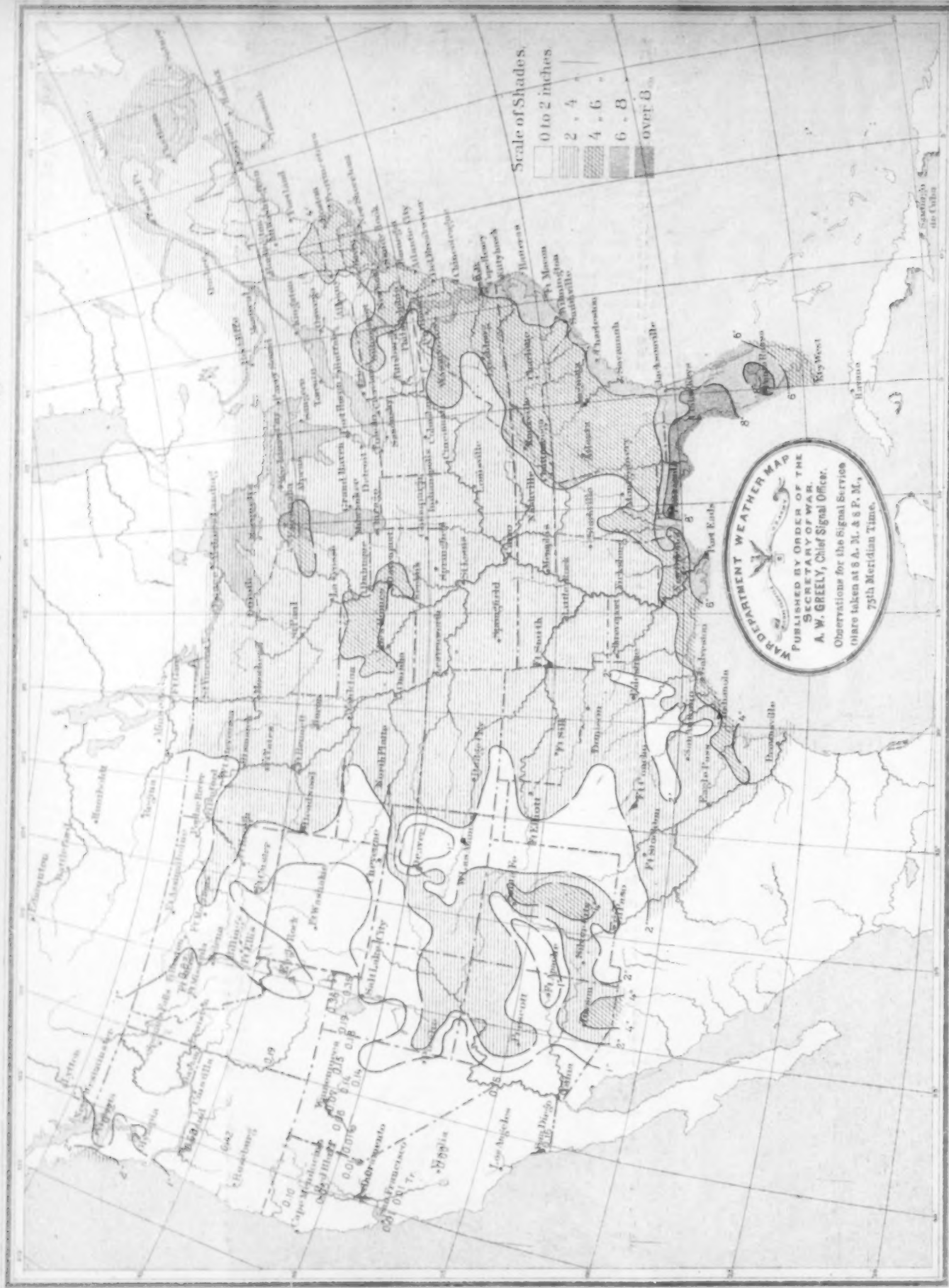


Chart V. 16 years Normal Precipitation for August.

Scale 100 F



List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for the Monthly Weather Review. Those marked with an asterisk (*) did not send reports in time to be used in Review for August, 1888.

Place of observation and observer.	Place of observation and observer.	Place of observation and observer.	Place of observation and observer.
ALABAMA. Auburn, Alabama Weather Service. Citronelle, J. G. Michael. Livingston, J. W. A. Wright. New Market, Dr. Geo. D. Norris.	ILLINOIS—Continued. Jacksonville, P. J. Hasenstab. Mount Morris, Wm. Feary. Oswego, John S. Seely. Palestine, John E. Templeton. Pekin, Rev. J. E. Terborg. Philo, H. A. Burr. Riley, John W. James. Rockford, T. D. Robertson. Sycamore, Roswell Dow. Sandwich, Dr. N. E. Ballou. South Evanston, Dr. M. D. Ewell. Springfield, Illinois Weather Service. Windsor, A. H. Hatch.	KENTUCKY. Bowling Green, M. H. Crump. *Carlisle, W. H. Fritts. Elkin, Chas. Ogden. Frankfort, E. C. Went. Millersburg, C. Pope.	NEVADA. Carson City, Chas. W. Friend. Carson City, Nevada Weather Service.
ARIZONA. Antelope Valley, Mrs. J. H. Hamilton. *Bangharts. Cedar Springs, J. E. Norton. *Eagle Pass, R. B. Tripp. *Flagstaff, Braumen & Co. Globe, J. H. Hamill. Holbrook, David Rohe. Huachuca, J. W. Stump. Prescott Junction, W. W. Burneh. *Showlow, C. E. Coolry. Tevis, Miss Belle Tevis. Tucson, Edward L. Wetmore. Williams, J. T. Ryan. Willow Springs, F. A. Chamberlin. Winslow, L. W. Broberts.	INDIANA. Butlerville, C. F. Hole. Connersville, Robt. Hessler. Jeffersonville, J. C. Loomis. *Laconia, Lafa Crozier. La Fayette, Indiana Weather Service. *La Grange, R. H. Rerick. Logansport, Thos. B. Helm. Mauzy, Elwood Kirkwood. Salem, J. W. May. Scalesville, Urias Wilson. Sunman, B. F. Ferris. *Vevay, Prof. Chas. Boerner.	LOUISIANA. Grand Coteau, Rev. C. M. Widman. Liberty Hill, E. A. Crawford. Luling, F. M. Rogers. New Orleans, Louisiana Weather Service. *Port Eads, Mrs. C. L. Kleinpeter.	NEW HAMPSHIRE. Antrim, Frank W. Palmer. Berlin Mills, Q. A. Bridges. Concord, W. L. Foster. Nashua, Chas. H. Webster. *Ashland. Belmont. Bristol. Lake Village, Lake Winipisageogee Cotton and Woolen Manufacturing Co. Wells Bridge. Wolfeborough.
ARKANSAS. *Eureka Springs, A. H. Foote. Lead Hill, Silas C. Turnbo. Little Rock, Arkansas Weather Service.	INDIAN TERRITORY. Caddo Creek, B. Leming, M. D.	MAINE. Bar Harbor, Joseph Wood. Cornish, Silas West. Gardiner, Henry Richards. Kent's Hill, W. C. Strong. Orono, Prof. M. C. Fernald.	NEW JERSEY. Beverly, C. F. Richardson. Clayton, W. T. Wilson. Egg Harbor City, H. Y. Postma. Moorestown, Thos. J. Beans. New Brunswick, New Jersey Weather Service. Readington, John Fleming. South Orange, Dr. W. J. Chandler. *Vineland, Dr. O. H. Adams.
CALIFORNIA. *Anderson, Dr. A. Fouch. Banning, Welwood Murray. Barstow, Geo. R. Gooding. Georgetown, C. M. Fitzgerald. *Hydesville, E. T. Foss. Lewis Creek, John Touby. Needles, John J. Clark. *Nicolans, Alvah Pendleton. Oakland, Dr. J. B. Trembley. Oroville, Hiram Arenis. *Riverside, A. K. Holt. Salinas, Dr. E. K. Abbott. Sacramento, S. H. Gerrish. Santa Barbara, H. D. Vall. Santa Maria, L. E. Blochman. Willows, David Bentley.	IOWA. *Albion, Enoch Lewis. Amana, Conrad Schadt. *Ames, J. Rush Lincoln. *Anburn, Edwin Miller. Bancroft, H. N. Renfrew. Cedar Rapids, H. D. Olds. Clarinda, A. S. Van Sandt. *Clear Lake, Dr. J. C. Wright. Clinton, Luke Roberts. Cresco, Gregory Marshall. Cromwell, E. E. Harrison. *Denmark, G. B. Brackett. Des Moines, Adolphus Voegeli. Dysart, Jos. Dysart. Elkader, J. N. Hamilton. *Fairfield, Geo. D. Clark. Fayette, Upper Iowa University. Fort Madison, Miss L. A. McCready. Glenwood, Seth Dean. Glenwood, A. Schappel. Grinnell, Prof. S. J. Buck. Hampton, E. C. Grenelle. Humboldt, Miss. Florence Prouty. Independence, Emil F. Walfke. Iowa City, Prof. A. A. Vebien. Logan, Mrs. M. B. Stern. Manson, W. L. Thompson. Maquoketa, A. B. Bowers. Monticello, H. D. Smith. Mount Pleasant, Pro. Max E. Witte. Mount Vernon, Prof. Alonzo Collin. Muscatine, J. P. Walton. Osage, G. D. Pettingill. Osceola, F. M. Kyte. Oskaloosa, Joseph Boyd. Oskaloosa, O. H. Avey. Sac City, Dr. Caleb Brown. Smithland, Dr. Chas. Rice. Vinton, T. F. McCune. Washington, Wm. A. Cook. *Webster City, Elon Lee. *Wesley, Wm. Ward.	MARYLAND. Barren Creek Sp'gs, Albert E. Acworth. Cumberland, E. T. Shriver. Fallston, Prof. G. G. Curtis. *Gaithersburg, John T. De Sellum. Great Falls, Washington Aqueduct. McDonogh, McDonogh Institute. *Mt St. Mary's, Mt St. Mary's College. Woodstock, Woodstock College.	NEW MEXICO. *Albuquerque, S. M. Rowe. *Coldge, H. M. Moran. Gallinas Spring, J. E. Whitmore. Las Vegas, F. W. Chatfield.
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